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**RECORD OF DECISION  
for the  
UNITED STATES AIR FORCE  
EIELSON AIR FORCE BASE, ALASKA**

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Declaration of the Record of Decision

Decision Summary

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Responsiveness Summary

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## **DECLARATION OF THE RECORD OF DECISION**

### **Site Name and Location**

Eielson Air Force Base  
North Star Borough, Alaska

### **Operable Unit 1B**

Source Areas: ST20 Refueling Loop  
ST48 Powerplant Fuel Spill Area  
ST49 Building 1300  
SS50 - SS53 Blair Lakes Target Range

### **Statement of Basis and Purpose**

This decision document presents the selected interim remedial action for the removal of floating petroleum product at sites within the Operable Unit 1B. This action was chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) as amended by the Superfund Amendments and Reauthorization Act (SARA), the May 21 1991 Eielson Air Force Base Federal Facility Agreement (FFA), and to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This decision is based on the Administrative Record for Operable Unit 1B.

The State of Alaska concurs with the selected remedy.

### **Assessment of the Site**

Actual or threatened releases of hazardous substances from this site, if not addressed by implementing the response action selected in this Record of Decision, may present an imminent and substantial endangerment to public health, welfare or the environment.

### **Description of the Selected Remedy**

The interim action for the OU1B sites is intended to prevent further degradation of the groundwater quality by significantly reducing the volume of petroleum product floating on the groundwater. To the extent practicable, the interim action will be consistent with the final response action for OU1 scheduled to be determined in 1994. The OU1 Record of Decision will address additional source control and

groundwater response actions, as appropriate.

The major components of the selected remedy for each site are described below:

**ST20 Refueling Loop E-7 Complex: Bioventing**

- Install vents to inject oxygen into subsurface soils to enhance microbial biodegradation of fuel hydrocarbons in the vadose zone;
- Add nutrients and/or moisture and/or heat, as necessary, to increase biodegradation rates; and
- Monitor: (1) soil gas monitoring probes to determine local oxygen concentrations and degree of biodegradation; (2) surface gas emissions, if any, (3) and floating petroleum product.

**ST20 Refueling Complex E-9 Complex: Free Product Extraction**

- Extract floating petroleum hydrocarbons from the groundwater through wells, culverts, or trenches using skimmer or dual pump systems;
- Recycle or dispose of recovered floating petroleum product; and
- Treat extracted groundwater, as needed, through physical/chemical processes and discharge appropriately.
- Monitor floating petroleum product levels.

**ST48 Powerplant Fuel Spill Area: Vacuum Extraction**

- Install small diameter tubes to extract floating petroleum product and to enhance aerobic degradation of fuel hydrocarbons in the vadose zone;
- Treat offgas through an air emissions control system prior to release to the atmosphere;
- Recycle or dispose of recovered floating petroleum product;
- Treat extracted groundwater, as necessary, through physical/chemical processes and discharge appropriately; and
- Monitor: (1) soil gas monitoring probes to determine degree of biodegradation; and (2) floating petroleum product.

**ST49 Building 1300 and SS50-53 Blair Lakes Target Range: Free Product Extraction**

- Extract floating petroleum hydrocarbons from on top of the groundwater through wells, culverts, or trenches using skimmer or dual pump systems;
- Recycle or dispose of recovered floating petroleum product;
- Treat extracted groundwater, as needed, through physical/chemical processes and discharge appropriately; and
- Monitor floating petroleum product.

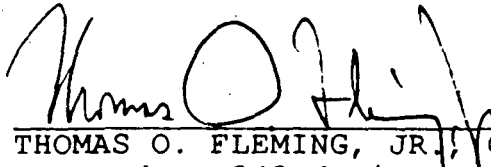
**STATUTORY DETERMINATIONS**

This interim action is protective of human health and the environment, complies with Federal and State applicable or relevant and appropriate requirements for this limited-scope action, and is cost-effective. Although this interim action is not intended to fully address the statutory mandate for permanence and treatment to the maximum extent practicable, this interim action utilizes treatment and thus is in furtherance of that statutory mandate.

Because this action does not constitute the final remedy for the Eielson AFB Operable Unit 1 site, the statutory preference for remedies that employ treatment that reduces toxicity, mobility, or volume as a principal element, although partially addressed in this remedy, will be addressed by the final response action.

Subsequent actions are planned to address fully the threats posed by the conditions at Operable Unit 1. Because this remedy will result in hazardous substances remaining on site above health-based levels, a review will be conducted to ensure that the remedy continues to provide adequate protection of human health and the environment within five years after commencement of the remedial action. Because this is an interim action ROD, review of this site and of this remedy will be continuing during development of final remedial alternatives for Operable Unit 1.

Signature sheet for the foregoing Eielson Air Force Base Record of Decision between the United States Air Force and the U.S. Environmental Protection Agency, with concurrence by the Alaska Department of Environmental Conservation.

  
THOMAS O. FLEMING, JR., Colonel, USAF  
Commander, 343rd Wing  
Eielson Air Force Base, Alaska

24 Sep 92  
Date

Signature sheet for the foregoing Eielson Air Force Base Record  
of Decision between the United States Air Force and the U.S.  
Environmental Protection Agency, with concurrence by the Alaska  
Department of Environmental Conservation.

Dana A. Rasmussen

DANA A. RASMUSSEN  
Regional Administrator  
Region 10  
U.S. Environmental Protection Agency

9/29/92

Date

Signature sheet for the foregoing Eielson Air Force Base Record of Decision between the United States Air Force and the U.S. Environmental Protection Agency, with concurrence by the Alaska Department of Environmental Conservation.

  
WILLIAM D. MCGEE

Regional Administrator

Northern Regional Office

Alaska Department of Environmental Conservation

9/17/92  
Date

## **DECISION SUMMARY**

### **Introduction**

The Air Force has identified a number of potential contaminant source areas at Eielson AFB. These potential source areas were grouped into six operable units (OUs), based upon similar contaminant and environmental characteristics. This Record of Decision addresses a group of sites called OU1B which include areas where surface and subsurface petroleum spills have resulted in floating petroleum products on the groundwater.

### **I Site Name, Location, and Description**

Eielson Air Force Base is located approximately 26 miles southeast of Fairbanks, Alaska, and is primarily a tactical air support installation. Typical activities at the base include flight operation, aircraft maintenance, and support functions. Since 1943, the major sources of hazardous materials include industrial operations, fire suppression training, and fuel management.

The main base, located along the Richardson Highway, is approximately 19,700 acres in size. The Blair Lakes Target Range Facility which is located approximately 25 miles southwest of the main base, is approximately 2 acres in size. Because of its geographical proximity to Eielson AFB, the Air Force is including the Blair Lakes Facility in the scope of the investigation.

This Record of Decision establishes the selected remedy for four sites at the base: (1) ST20, the Refueling Loop; (2) ST48, the Powerplant Fuel Spill Area; (3) ST49, Building 1300; and (4) SS50 through SS53, Blair Lakes Target Range. The location of the four sites are shown in Figure 1a and b.

Three communities (Moose Creek, North Pole, and Salcha) lie within a twenty-mile radius of the base. The land surrounding Eielson AFB is primarily used for military training associated with Fort Wainwright. All lands north and east of Eielson AFB belong to the Department of the Army. Lands northwest, west, and south of the base are predominantly Tanana River and Chena River flatlands which are composed of river bottomlands, woods and scrub lands. Besides the community of Moose Creek (northwest of the base) there are few scattered residential and commercial activities close to the base.

Drinking water for Moose Creek and North Pole is supplied primarily by private wells. Eielson AFB receives its drinking water primarily from a water treatment plant which is supplied by on-base deep water wells. The aquifer beneath Eielson AFB has been designated as a sole-source aquifer.

The surface water bodies nearest to the seven source areas are Garrison Slough, French Creek, Moose Creek, Pile Driver Slough and the Tanana River. Approximately 70% of Eielson Air Force Base and virtually all of the Blair Lakes Target Range are wetlands. However, all of the proposed actions will take place on previously filled land and will have no adverse environmental impacts on wetlands.

## II Site History and Enforcement Activities

Eielson AFB was originally a satellite installation of Fort Wainwright (previously Ladd Field) called Mile 26. Mile 26 was initially constructed between 1943 and 1944. The field was deactivated at the end of World War II, but was reopened again in 1947 as a future strategic base. Many of the base facilities were built during a major construction program from 1947 to 1954. The base was used jointly by the Army and the Air Force during the 1950s. Mile 26 was officially redesignated Eielson AFB in February 1948.

Eielson's primary mission was tactical air support for the Alaskan Air Command but is currently included in the Pacific Air Forces. Currently, the host unit at Eielson AFB is the 343rd Wing. Airborne missions of the 343rd Wing include emergency war order and contingency planning, tactical air forces training for close air support and battle field interdiction, and air refueling operations.

The majority of industrial operation at Eielson AFB have been in existence since the early 1950s. Industrial operations and related wastes were insignificant prior to 1950. Major industrial operations at the base include propulsion shops, pneumatic/hydraulics shops, aerospace ground equipment, maintenance shops, nondestructive inspection labs, and vehicle maintenance shops. Industrial wastes have generally been grouped into three categories: waste oils, contaminated fuels and sludges, and spent solvents and cleansers. For the period from 1950 to 1982, the total quantity of industrial wastes is estimated to range from 25,000 to 40,000 gallons per year.

Previous investigations regarding environmental contamination at Eielson AFB were conducted under the Air Force Installation Restoration Program (IRP). The four-phase IRP was initiated in 1982 with a Phase 1 record search to identify past disposal sites containing contaminants that may pose a hazard to human health or the environment. Under the IRP, the Air Force identified 64 potential areas of contamination at Eielson AFB. Potential source areas include old landfills, storage and disposal areas, fueling system leaks, and spill areas.

Eielson AFB was placed on the National Priorities List in November 1989. In May 1991, the Air Force, EPA, and the State of Alaska entered into a Federal Facility Agreement (FFA) which established the procedural framework and schedule for developing, implementing, and monitoring CERCLA response actions. Under the FFA, the 64 potential source areas were placed in one of six operable units, based on similar contaminant and environmental characteristics, or were included for evaluation under a Source Evaluation Report.

### III Community Relations

In October, 1991, the Air Force held a public meeting to describe the cleanup efforts being planned to address soil and groundwater contamination at OU1. Announcements for the meeting were published in the local newspaper. The Community Relations Plan was made available in October 1991. The Administrative Record was placed in the Rasmuson Library at the University of Alaska, Fairbanks in March, 1992.

In accordance with sections 117 and 113(k)(2)(b), the public was encouraged to participate in the remedy selection process. The proposed plan for OU1B was mailed to over 130 interested parties and distributed to libraries at the University of Alaska Fairbanks, North Pole and the Noel Wein Library in Fairbanks in May 1992. The proposed plan summarized the alternatives evaluated and presented the preferred alternative. Approximately 15 people attended a public meeting held on June 9, 1992 at the North Pole Middle School. The public meeting was announced by six advertisements in the local newspaper and the base cable TV network. A news release was provided to the local news media explaining the proposed plan. This resulted in a front page article about the cleanup efforts in the Fairbanks Daily News Miner. A 30-day comment period was held from May 15 to June 15, 1992. No requests for extensions were received during the comment period. Responses to comments received at the public meeting and written comments are included in the attached Responsiveness Summary.

#### **IV Scope and Role of Response Action within Site Strategy**

The Air Force is currently conducting a comprehensive investigation of groundwater and soil contamination for all sites in this Operable Unit. During this investigation, floating petroleum products were found at several locations. Under the Superfund program, early actions, or interim actions, are used to expedite the completion of total site cleanup. It is expected that this interim action will accelerate the overall cleanup process for OU1.

The selected remedy for this interim action is intended to begin the process of cleaning up four sites containing floating petroleum products in OU1. The purpose of this interim action is to expedite the cleanup by eliminating the primary source of the contamination and by reducing the volume of the floating product on the water table. It is anticipated that activities under this interim action will continue for approximately five years or until the practical limit is reached for floating petroleum product recovery, whichever is sooner. To the extent practicable, this interim action will be consistent with the comprehensive investigation scheduled to be completed in 1993.

This interim action focuses on removing floating petroleum product to prevent migration of contaminants and allow for collection of sufficient information about the system response to allow for a final remedy selection. The petroleum product floating on the water table should be removed in its concentrated form, before harmful constituents such as benzene, toluene, and xylene dissolve into the groundwater. Once the contaminants are in the groundwater pathway, they can begin to migrate, thereby increasing the volume of contaminated material and the potential risk to human health and the environment.

This interim action is consistent with future actions that may be undertaken to address contaminated soil and groundwater in OU1.

## V SUMMARY OF SITE CHARACTERISTICS

### Subsurface Conditions

Eielson Air Force Base is located in the Tanana Valley and is underlain by approximately 200 feet of unconsolidated fluvial and glaciofluvial sediments. These sediments consist of predominantly interbedded layers of well-graded sand and gravel and are underlain by metamorphic and intrusive bedrock materials. Permafrost conditions occur in undeveloped locations within the valley; however, in areas of surface development, only localized pockets of permafrost remain. Permafrost conditions are reported at the Blair Lakes Target Range, but are not expected beneath most Eielson AFB locations. It is anticipated that seasonal frost zones may extend into the shallow water table at the Base during winter; however, site-specific winter data on the groundwater conditions have not been collected to date.

### Groundwater Conditions

The upper unconfined aquifer extends from the ground surface to a depth of about 200 feet. Groundwater at the Eielson and Blair Lakes sites typically occurs at depths of less than 10 feet below ground surface and flows regionally toward the north-northwest (HLA, 1989). Horizontal groundwater gradients are reported to be 4 to 6 feet per mile at the Base, resulting in relatively slow groundwater movement. The hydraulic properties of the aquifer are not well characterized at this time; however, hydraulic conductivities are typically high (approximately 200 feet per day) for sand and gravel sediments. Groundwater within the sedimentary aquifer occurs under unconfined to semi-confined conditions. Vertical gradient data for the study area are not currently available but will be evaluated as needed for individual source areas. No distinct aquitard horizons have been identified in the unconsolidated deposits.

Shallow groundwater beneath the sites is classified as a sole-source aquifer and provides the base with drinking water as well as domestic, irrigation, and industrial water supplies.

A brief summary of selected information on facility operations and subsurface environmental conditions for source areas of concern is presented below. A summary of floating petroleum product thickness measurements is given in Table 1. Approximate areas and extent of floating product for each site are shown in Figures 2 through 7. A summary of analytical results for groundwater sampling are presented in Tables 2 through 8.

## **ST20 Refueling Loop**

Source Area ST20 is an active aircraft refueling loop and includes three refueling complexes, E-7, E-8, and E-9 (see Figures 2 through 4). The complexes contain underground fuel tanks, piping, and associated pump houses. The refueling loop is generally flat, consisting of asphalt-covered taxiway and refueling pads with adjacent unpaved areas of gravel and grass. Site data indicate a range in depths to shallow groundwater of between 3 and 9 feet below ground surface and a northwesterly direction of flow. Sediments at ST20 generally include sand and gravel deposits.

The sources of petroleum, oil, and/or lubricants (POL) contamination at ST20 include historic surface spills and leaky underground pipes. Considerable subsurface investigation has been performed at the source area since 1982, including borehole soil sampling, soil vapor sampling, groundwater probe sampling, monitor and extraction well installations, and surface water sampling. A summary of analytical results of the groundwater investigations is presented in Tables 2 and 3.

Floating petroleum product has been measured above the shallow groundwater at each of the three refueling complexes. Results are summarized in Table 1. The approximate extent of each of the pools of floating petroleum product at complexes E-7, E-8, and E-9 was investigated using temporary groundwater probes (HLA, 1990). Floating petroleum product was observed at the E-8 complex in 1989, but not in more recent monitoring.

## **ST48 Powerplant Fuel Spill Area**

Source Area ST48 shown in Figure 5, is located in the east-central portion of Eielson AFB, near the intersection of Division Street and Industrial Drive. The site is adjacent to a coal-generated powerplant, an ash storage house, active railroad lines, two cooling water supply wells and one drinking water supply well, and abandoned below-grade fuel lines.

The abandoned gasoline and diesel pipelines reportedly served as delivery lines from bulk storage tanks to an old military service station located at the intersection of Division Street and Industrial Drive. It is not known if the fuel pipelines were drained and purged when they were taken out of service.

Previous findings from a soil vapor survey, product level measurements, and analytical soil and groundwater data indicate that the greatest amount of fuel contamination lies along the abandoned fuel pipelines passing beneath Industrial Drive. A summary of analytical results for groundwater are presented in Tables 4 and 5. Floating petroleum product has been found at a number of locations near the abandoned fuel pipelines where they cross beneath Industrial Drive. A summary of floating product measurements is presented in Table 1. Floating petroleum product sampled from Well 48M01 may be arctic diesel, based on hydrocarbon fingerprint analytic results (HLA, 1990). The extent of floating petroleum product is estimated to be approximately 100 feet by 100 feet. The maximum observed floating product thickness was over 1.51 feet.

Based on available data, the direction of groundwater flow at ST48 varies from east to northeast, and is probably influenced by pumping from water supply wells located approximately 500 feet east (Wells 1 and 2 -- powerplant cooling water wells) and 500 feet north (Well D) of the floating product pool. Permafrost conditions were not encountered during field investigations near ST48, nor were permafrost conditions reported for Wells 1 and 2.

Floating petroleum product was also detected at the newly constructed Ash Storage House, approximately 225 feet north of Well 48M01. Dewatering activities during construction of the Ash Storage House may have induced migration of the floating petroleum product from the vicinity of 48M01 toward the Ash Storage House. No potential source areas near the Ash Storage House are known.

#### **ST49 Building 1300**

ST49 is located just south of the main runway, in the southern portion of the base as shown in Figure 6. The source area is approximately 8 acres in size and includes Building 1300 and the adjacent taxiway, which together comprise an active combat alert hangar complex (CAC). The site is relatively flat with elevated taxiway and hangar construction.

A utility room is located on the east side of the hangar and contains a 550-gallon above-ground diesel fuel tank for the CAC generator. The above-ground tank is supplied on an approximately daily basis by two 10,000-gallon below-grade fuel tanks located at the southern end of the hangar. There is a floor drain in the utility room that has received diesel overspill. It is not known whether the floor drain line is connected to the CAC septic system and drain field. Floor

drains are also located within the hangar and are reportedly connected to the septic system and drain field located just south of the hangar.

Six monitoring wells and one product recovery well are located at the source area. Water level data from these wells indicate that depth to groundwater ranges from 7 to 10.5 feet below ground surface and flows toward the north. Permafrost conditions were reported at depths of approximately 25 feet in 1988 in HLA well logs for wells 49M04 and 53M05 located just north of the complex.

ST49 was investigated during the HLA 1988 (Phase II, Stage 3) and 1989 (Phase II, Stage 4) field investigations, which included borehole soil sampling, soil vapor sampling, groundwater sampling from probes and monitoring wells. A summary of analytical results of these groundwater investigations are presented in Tables 6 and 7.

Floating petroleum product was detected above the shallow water table at the north end of the hangar in 1988 and 1989 (wells 49M02 and 49M06), and just north of the utility room (well 49GMW). Product probes were installed to further delineate the lateral extent of floating product in the area; however, access restrictions prevented product delineation beneath the hangar and surrounding paved areas. Floating product thickness measurements are presented in Table 1. The estimated extent of floating product is approximately 200 feet by 75 feet with a maximum reported thickness of 2.15 feet in 49M02 in 1988. Product recovery was implemented for a time beginning in 1988 at Well 49GMW and occasional product removal was conducted in Well 49M02. Hydrocarbon identification analyses were performed on product samples collected from Wells 49M02 and 49GWM, and indicated the product is predominantly C9-C19 diesel fuel.

#### **SS50 through SS53 Blair Lakes Target Range**

The Blair Lakes Target Range shown in Figure 7 is located approximately 24 miles southwest of Eielson AFB and can be reached in summer by helicopter or in winter by way of an ice bridge across the Tanana River. The site includes a vehicle maintenance shop, above-ground diesel and gasoline tank farm (and associated product delivery lines), generators, and storage outbuildings on a central gravel pad area. Aircraft target ranges and drum disposal areas are located outside the gravel pad area.

Groundwater flows toward the north at Blair Lakes and occurs at depths of approximately 9 feet below ground surface. Permafrost was encountered at a depth of 7 feet in an HLA boring adjacent to the tank farm area and is expected to be present beneath portions of the gravel pad that are not subject to thawing effects from adjacent heated buildings. Permafrost was not encountered during HLA's drilling activities in the areas outside the gravel pad.

Potential source areas at the Blair Lakes facility were investigated by HLA in 1988 (Phase II, Stage 3) and 1989 (Phase II, Stage 4) and included borehole soil sampling, soil vapor sampling, groundwater sampling from probes and monitoring wells. A summary of analytical results of the groundwater investigations is presented in Tables 8 and 9.

HLA investigations indicated several potential sources for fuel-related contamination at Blair Lakes. A diesel spill from an above-ground diesel day tank is believed to be the primary source of fuel contamination detected in the base water supply well, located in the eastern corner of the vehicle maintenance shop. Monitoring Well 50M01 was installed in 1988 approximately 35 feet southeast of the supply well and 0.7 feet of floating petroleum product was measured. Product probes were installed in the vicinity in 1989 to investigate floating product; however, no product measurements were made at that time. Floating product thickness measurements made at the Blair Lakes facility in 1991 are listed in Table 1.

The tank farm and vicinity are potential sources, based on elevated total petroleum hydrocarbon (TPH) concentrations in soil samples near the tanks. Other nearby potential sources include spills at the fuel pump island approximately 30 feet west of the tank farm, or leaks in the associated underground piping. An additional area of concern is a former underground fuel line construction ditch located between the vehicle maintenance shop and the tank farm. The ditch was excavated in 1986, floating product was observed above the water table, and the ditch was backfilled. The specific source of the product is not known.

TABLE 1. Floating Petroleum Product Measurements

Sheet 1 of 3

Site	Well Number	Date Sampled	Product Thickness (ft)	Comment
ST20 E-7 Complex	20M04	9-5-89 8-21-91	1.7 0.85	Product JP-4
	20PP08	9-17-89 8/21/91	0.01 0.00	
	20PP09	9-17-89 8/21/91	0.78 0.00	
	20PP12	9-17-89 8/21/91	0.37 0.00	
	20PP14	9-17-89 8/21/91	1.14 0.00	
	20PP15	9-17-89 8/21/91	0.50 0.00	
	20PP16	9-17-89 8/21/91	0.39 0.00	
	20PP17	9-17-89 8/21/91	0.01 0.00	
	20PP35	9-17-89 8/21/91	0.01 NM	
	20PP36	9-17-89 8/21/91	0.83 NM	
ST20 E-8 Complex	20M06	9-6-89 10-8-89 8-21-91	0.58 0.50 0.0	
	20PP51	10-8-89 10-27-89 8-21-91	0.01 0.01 NM	
	20PP52	10-27-89 8-21-91	0.01 NM	
	20PP79	10-27-89 8-21-91	0.01 NM	
	20PP80	10-27-89 8-21-91	0.01 NM	
ST20 E-9 Complex	20M01	9-4-89 10-10-89 8-21-91	0.14 0.30 0.0	
	20M07	9-1-89 10-10-89 8-21-91	1.70 1.60 0.94	Light yellow product (JP-4)
	20M25	10-18-89 8-21-91	1.41 0.14	Dark brown product (unknown)
	20PP57	10-10-89 8-21-91	0.29 NM	
	20PP60	10-10-89 8-21-91	0.21 NM	
	20PP71	10-10-89	0.58	
	20PP72	10-10-89	1.13	
	20PP73	10-10-89	1.26	
	20PP76	10-10-89	1.13	
ST20 General	M	8-22-91	0.69	
	N	8-22-91	0.42	
	P	8-22-91	0.63	
	S	8-22-91	0.81	
	T	8-22-91	0.87	

TABLE 1. Floating Petroleum Product Measurements

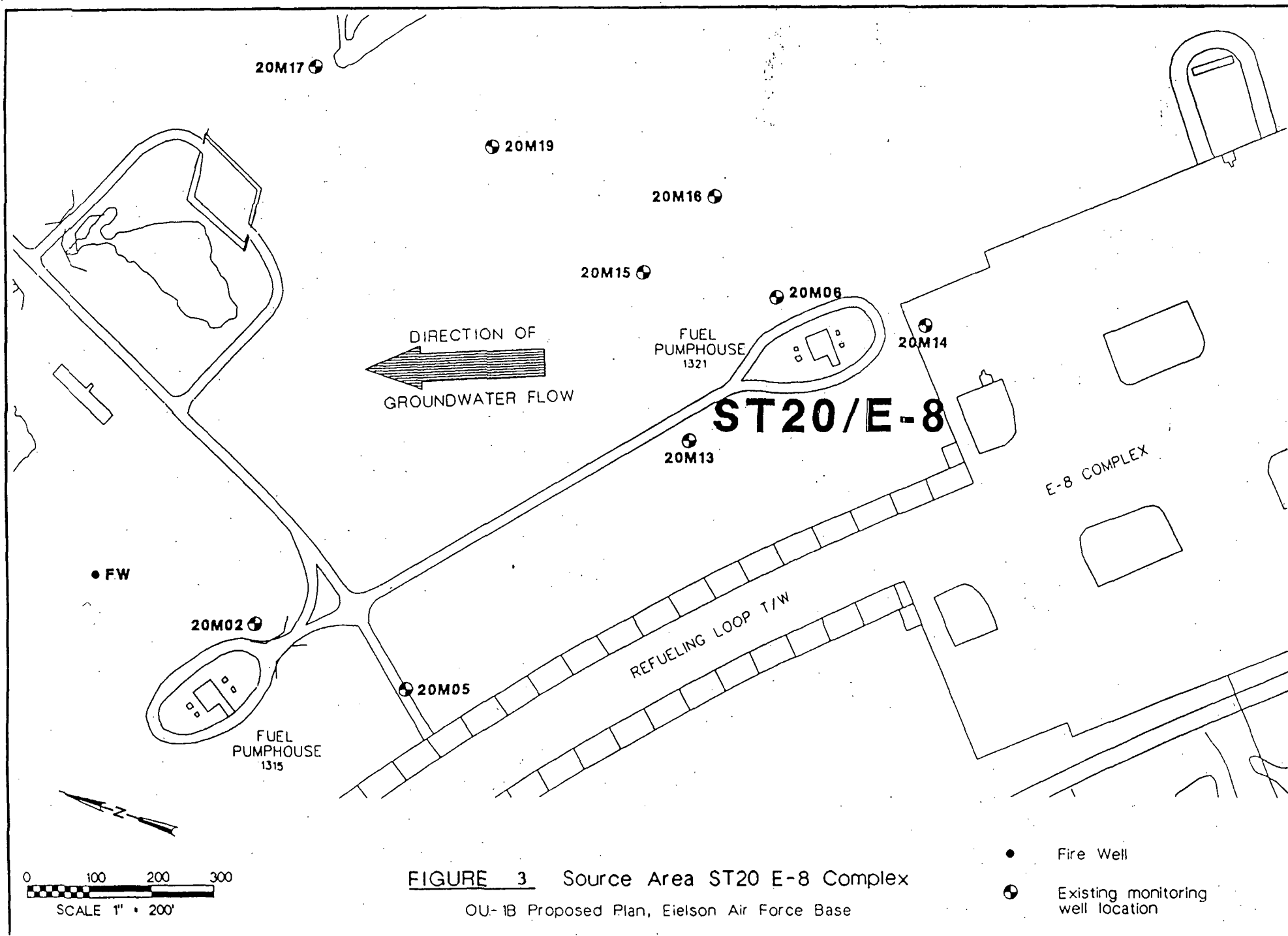
Sheet 2 of 3

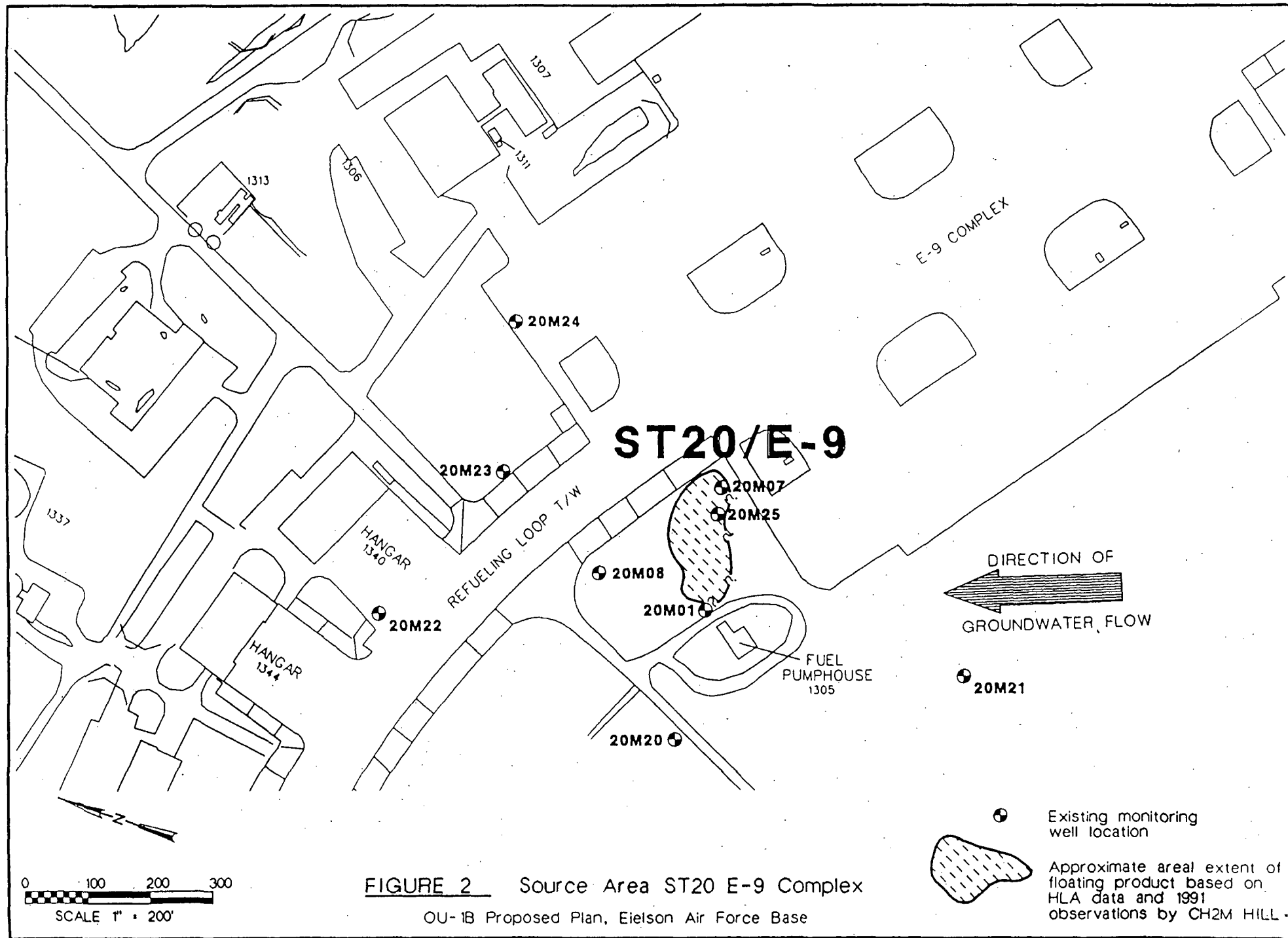
Site	Well Number	Date Sampled	Product Thickness (ft)	Comment
ST48	48MO1	9-23-88	0	
		8-20-91	0.11	
		8-28-91	0.80	
		10-9-89	0.63	
		8-22-91	0.12	
	48PP01	9-23-88	0.09	
	48PP06	9-23-88	0.42	
		9-17-89	0.28	
		10-22-89	0.27	
	48PP08	9-23-88	0.62	
		11-1-88	0.70	
		9-17-89	0.71	
		10-22-89	0.79	
		8-20-91	0.75	
		10-10-91	0.72	
	48PP09	9-23-88	0.68	
		11-1-88	0.75	
		9-17-89	1.32	
		10-22-89	1.27	
		8-20-91	1.51 +	
	48PP11	11-1-88	0.11	
		9-17-89	0.54	
		10-22-89	0.57	
	48PP28	9-23-88	0.11	
		10-31-88	0.29	
		9-17-89	0.61	
		11-22-89	0.12	
	10-1	8-28-91	0.19	
	10-8	8-28-91	1.32	
	48PP64	11-22-89	0.02	
	48PP68	11-22-89	0.11	
ST49	49MO2	9-23-88	1.28	
		10-28-88	2.15	
		9-18-89	0.61	
		8-20-91	0.62	
	49GMW	9-23-88	1.89	
		10-28-88	1.42	Headspace reading: 0.00 ppm OVM
		8-20-91	NM	
	49PP24	9-23-88	1.13	
		10-28-88 89	1.17 NM	Product probe destroyed
	49MO6	9-22-89	0.08	
		8-20-91	0.00	
	49PP47	9-22-89	0.28	

TABLE 1. Floating Petroleum Product Measurements

Sheet 3 of 3

Site	Well Number	Date Sampled	Product Thickness (ft)	Comment
SS50-53 and DP54 Blair Lake	50M01	9-30-88	0.70	Well casing heaved
		8-26-91	0.40	
	50PP81 50PP85	8-26-91	0.75	
		10-10-91	0.70	
		8-26-91	0.32	
		10-10-91	0.30	
NM = not measured. OVM = organic vapor monitor.				





**FIGURE 2** Source Area ST20 E-9 Complex  
OU-1B Proposed Plan, Eielson Air Force Base

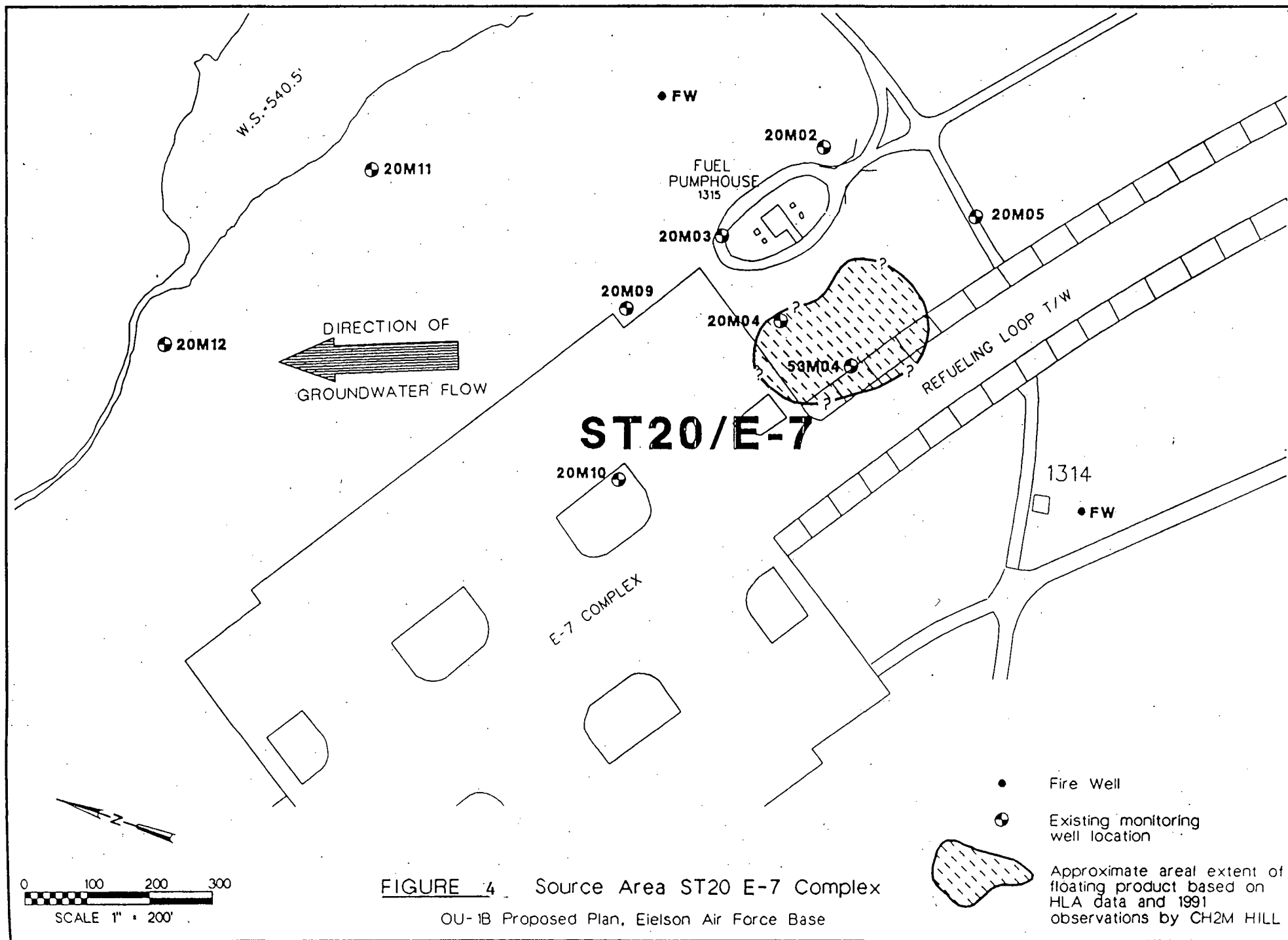
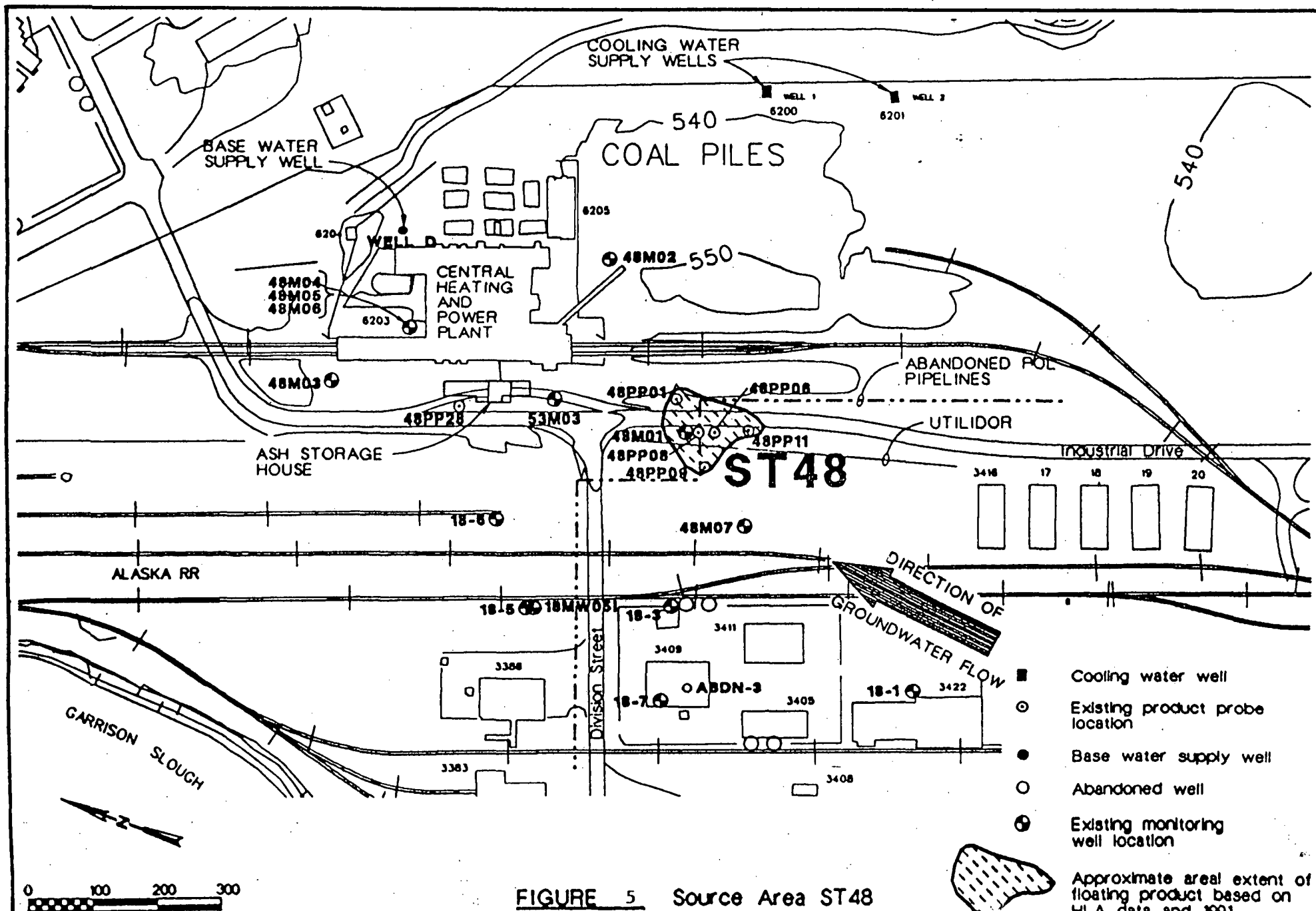
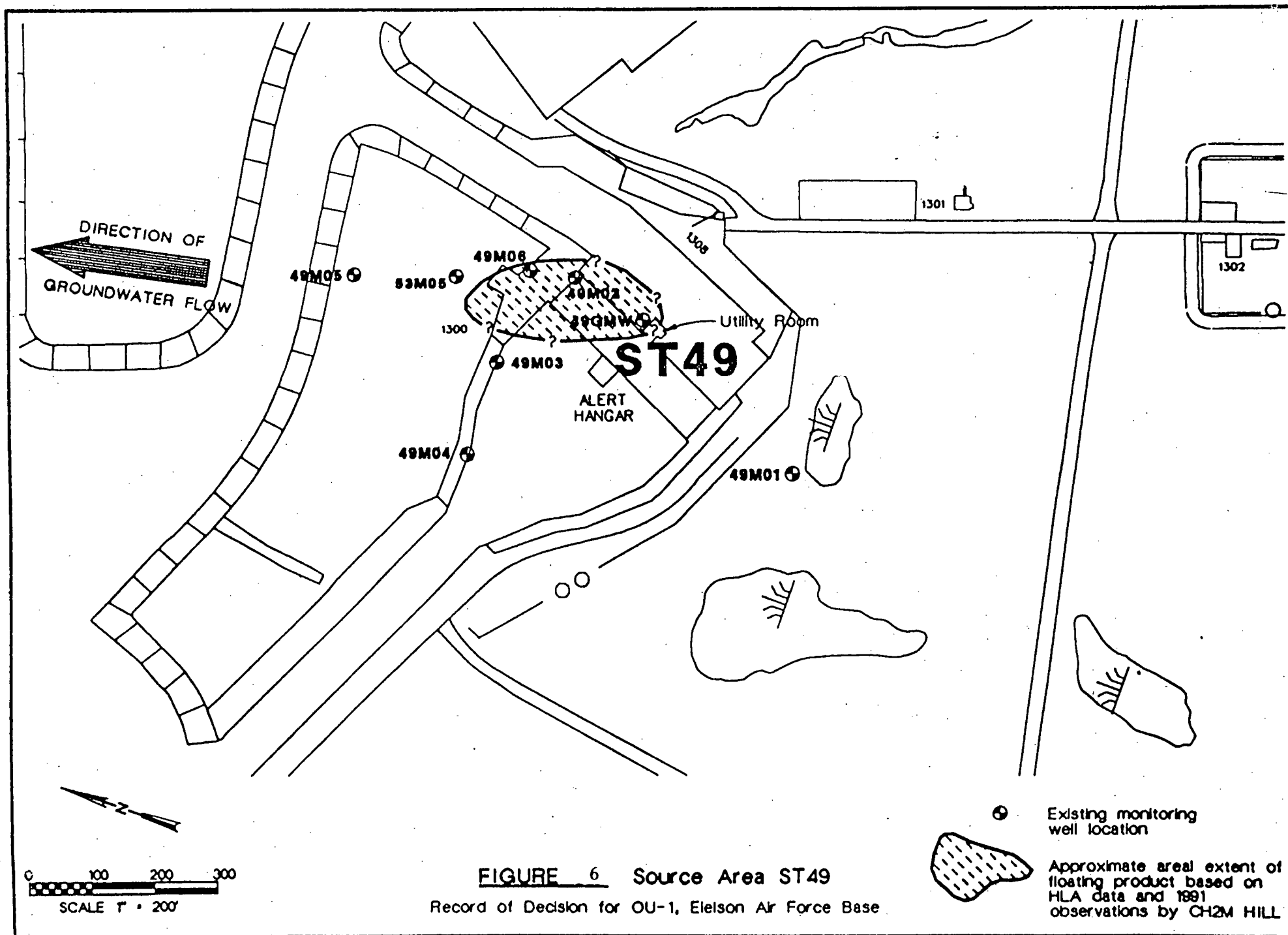


FIGURE 4 Source Area ST20 E-7 Complex

OU-1B Proposed Plan, Eielson Air Force Base

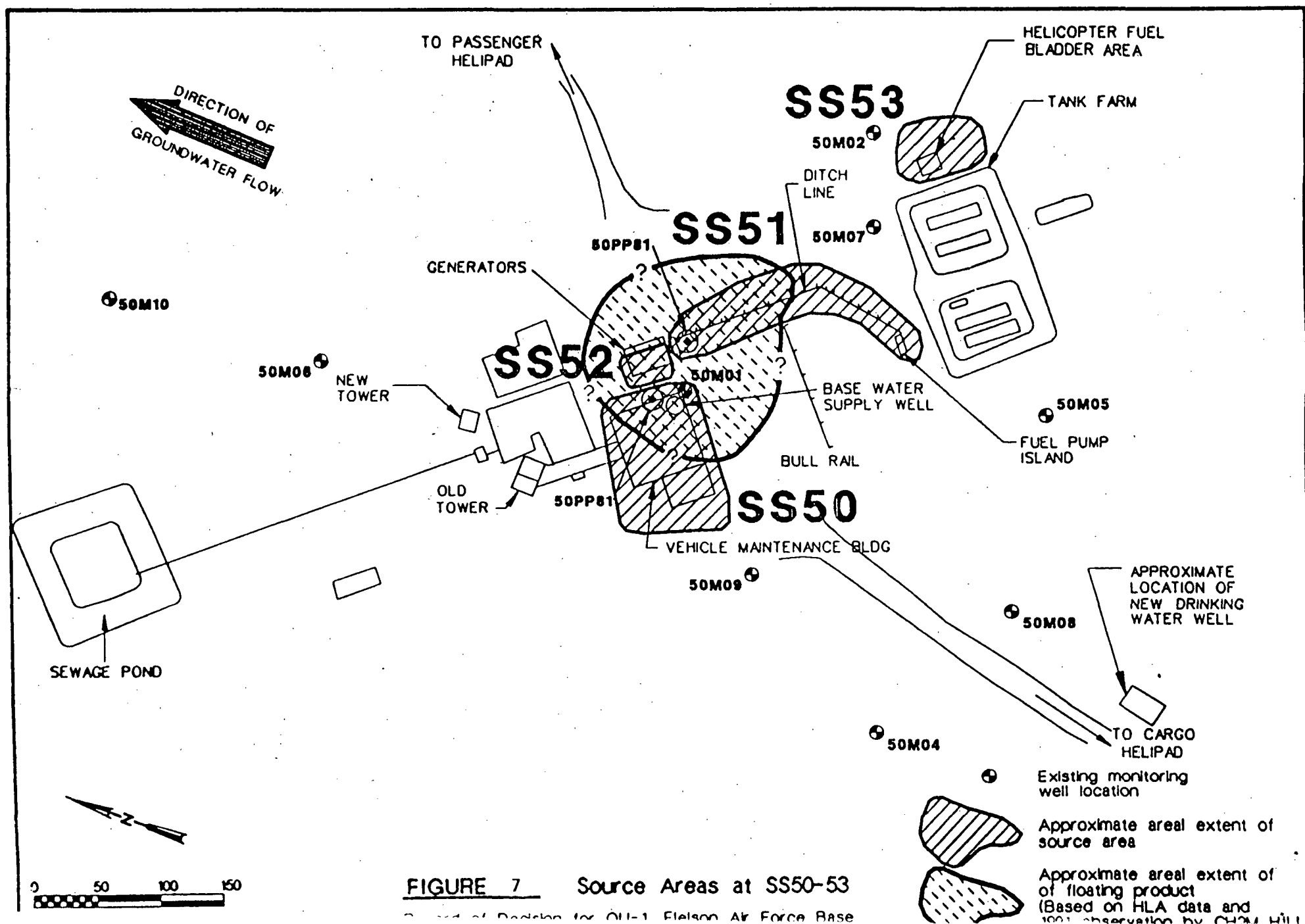




**FIGURE 6** Source Area ST49  
Record of Decision for OU-1, Eleison Air Force Base

● Existing monitoring well location

Approximate areal extent of floating product based on HLA data and 1991 observations by CH2M HILL



**Table 2 Summary of Groundwater Results for Site 20  
(Groundwater Probes)**

Constituent	Detection Limit (ug/L)	Detected/ Analyzed	Concentration Range Detected (ug/L)	Location of Maximum
<b>E-7 Complex</b>				
Benzene	1	18/31	1-330	20FW18
Toluene	1	8/31	1-3	20FW56
Ethylbenzene	1	2/31	1	20FW61
m,p-Xylene	1	3/31	1-2	20FW74
o-Xylene	1	2/31	1-2	20FW75
Methylene Chloride	1	3/25	4-5	20FW55
1,1-Dichloro-ethylene	5	4/25	6-32	20FW56
<b>E-8 Complex</b>				
Benzene	1	8/49	1-830	20FW70
Toluene	1	24/49	1-1,400	20FW70
Ethylbenzene	1	3/49	3-470	20FW02
m,p-Xylene	1	21/49	1-640	20FW02
o-Xylene	1	13/49	1-380	20FW70
<b>E-9 Complex</b>				
Benzene	1	12/31	2-25,000	20FW42
Toluene	1	14/31	2-21,000	20FW42
Ethylbenzene	1	9/31	1-1,600	20FW46
m,p-Xylene	1	16/31	1-4,700	20FW39
o-Xylene	1	14/31	1-1,400	20FW42

**Table 3 Summary of Groundwater Results for Site 20  
(Monitoring Wells)**

Constituent	Detection Limit ( $\mu\text{g/l}$ )	Detected/ Analyzed	Concentration Range Detected ( $\mu\text{g/l}$ )	Location of Maximum (complex)
<b>VOLATILES</b>				
Benzene	0.2	17/30	0.32-7170	20M04 (E-7)
Ethylbenzene	0.5	10/30	1.21-1120	53M04 (E-7)
Toluene	0.3	16/30	0.56-15900	53M04 (E-7)
Xylenes, Total	0.4	11/30	1.21-3820	20M04 (E-7)
<b>SEMIVOLATILES</b>				
Anthracene	1.0	1/19	1.7	20M01 (E-9)
Bis(2-ethylhexyl)phthalate	2.0	11/19	6.4-2900	20M06 (E-8)
Fluoranthene	1.0	1/19	6.3	20M01 (E-9)
2-Methylnaphthalene	1.0	3/19	39-260	20M07 (E-9)
Naphthalene	1.0	3/19	12-160	20M07 (E-9)
Phenanthrene	1.0	1/19	6.6	20M01 (E-9)
Pyrene	1.0	1/19	5.5	20M01 (E-9)
Petroleum Hydrocarbons (mg/l)	0.2	4/29	1.4-6.3	20M01 (E-9)
<b>Notes:</b> Samples from E-7 Complex wells were not analyzed for semivolatiles.				

**Table 4 Summary of Groundwater Results for Site 48  
(Groundwater Probes)**

Constituent	Detection Limit (ug/L)	Detected/ Analyzed	Concentration Range Detected (ug/L)	Location of Maximum
Benzene	1	6/24	80-7,100	48FW11
Toluene	1	7/24	40-6,600	48FW11
Ethylbenzene	1	9/24	3-950	48FW12
m,p-Xylene	1	9/24	5-3,300	48FW12
o-Xylene	1	8/24	5-1,300	48FW12
t-Dichloro-ethylene	5	2/24	17-490	48FW12

**Table 5 Summary of Groundwater Results for Site 48  
(Monitoring Wells)**

Page 1 of 2

Constituent	Detection Limit (ug/L)	Detected/ Analyzed	Concentration Range Detected (ug/L)	Location of Maximum
<b>1988 RESULTS</b>				
<b>VOLATILES</b>				
Benzene	0.15	5/10	0.34-1330	48M01
Ethylbenzene	0.46	2/10	89.2-160	48M01
Toluene	0.25	2/10	53.2-88.0	48M01
Xylenes, Total	0.85	3/10	1.62-929	48M01
<b>SEMIVOLATILES</b>				
Butylbenzylphthalate	1.5	1/10	520	48P01W1
Bis(2-ethylhexyl)phthalate	2.0	1/10	700	48P01W1
2,4-Dimethylphenol	0.28	1/10	5.1	48M01
2-Methylnaphthalene	0.9	2/10	130-251	53M03 <sup>b</sup>
Naphthalene	0.26	2/10	230-440	53M03
Petroleum Hydrocarbons <sup>a</sup> (mg/L)	0.1	2/10	3.4-44.0	48M01
<b>1989 RESULTS</b>				
<b>VOLATILES</b>				
Benzene	0.20	4/10	3.01-1,390	48M01
Ethylbenzene	0.50	1/10	143	48M01
Toluene	0.30	2/10	48.8-230	48M01
Total Xylenes	0.40	2/10	1550-1990	48M01
<b>SEMIVOLATILES</b>				
Bis(2-ethylhexyl)phthalate	2.0	2/10	44-52	48M07
2-Methylnaphthalene	1.0	4/10	24-140	48M01

**Table 5 Summary of Groundwater Results for Site 48  
(Monitoring Wells)**

**Page 2 of 2**

<b>Constituent</b>	<b>Detection Limit (ug/L)</b>	<b>Detected/ Analyzed</b>	<b>Concentration Range Detected (ug/L)</b>	<b>Location of Maximum</b>
Naphthalene	1.0	4/10	24-270	48M01
Petroleum Hydrocarbons (mg/L)	0.2	5/10	0.3-10.6	48M01

**Notes:**

\*Hydrocarbon fingerprint analysis for wells 48M01 and 48M02 indicated 4.2 mg/L Arctic Diesel and 13 mg/L of a C8-C20 hydrocarbon, respectively.

\*Well 53M03 also has been analyzed for major cations, major anions and selected metals.

**Table 6 Summary of Groundwater Results for Site 49  
(Groundwater Probes)**

<b>Constituent</b>	<b>Detection Limit (ug/L)</b>	<b>Detected/ Analyzed</b>	<b>Concentration Range Detected (ug/L)</b>	<b>Location of Maximum</b>
Benzene	1	12/24	1-6	49FW08
Toluene	1	0/24	—	—
Ethylbenzene	1	4/24	1-8	49FW03
m,p-Xylene	1	6/24	3-37	49FW03
o-Xylene	1	3/24	2-24	49FW03
Trichloroethylene	1	10/24	1-4	49FW10 49FW15
t-Dichloro- ethylene	1	1/24	2	49FW12

**Table 7 Summary of Groundwater Results for Site 49  
(Monitoring Wells)**

Page 1 of 3

Constituent	Detection Limit (ug/L)	Detected/ Analyzed	Concentration Range Detected (ug/L)	Location of Maximum
<b>1988 RESULTS</b>				
<b>VOLATILES</b>				
1,1-Dichloroethane	0.46	1/8	1.57	53M05 <sup>b</sup>
Trans-1,2-Dichloroethene	0.38	1/8	0.40	53M05
1,1,1-Trichloroethane	0.2	2/8	0.447-4.77	53M05
Trichloroethene	0.52	2/8	3.14-14.0	53M05
Trichlorofluoromethane	0.32	1/8	0.788	49M01
Benzene	0.15	4/8	0.35-4.71	49M03
Chlorobenzene	0.34	1/8	0.432	49M02
1,2-Dichlorobenzene	0.2	1/8	0.21	49M03
Ethylbenzene	0.46	3/8	0.55-5.37	49M02
Toluene	0.25	2/8	0.31-0.49	49M02
Xylenes, Total	0.85	2/8	3.99-18.1	49M02
<b>SEMIVOLATILES</b>				
Dibenzofuran	0.01	1/8	0.620	49M02
2-Methylnaphthalene	0.9	2/8	117	49M02
Naphthalene	0.26	2/8	6.2-62	49M02
Petroleum Hydrocarbons (mg/L)	0.01	1/8	28.4	49M02
<b>1989 RESULTS</b>				
<b>VOLATILES</b>				
1,1-Dichloroethane	0.400	2/8	0.457-1.01	49M05

**Table 7 Summary of Groundwater Results for Site 49  
(Monitoring Wells)**

Page 2 of 3

Constituent	Detection Limit (ug/L)	Detected/ Analyzed	Concentration Range Detected (ug/L)	Location of Maximum
1,1,1-Trichloroethane	0.200	5/8	0.333-1.50	49M06
Trichloroethene	0.600	5/8	0.963-6.93	49M05
Benzene	0.20	7/8	0.33-4.35	49M03
1,4-Dichlorobenzene	1.00	1/8	4.53	49M03
Ethylbenzene	0.50	5/8	0.63-3.26	49M06
Toluene	0.30	3/8	0.72-1.04	49M06
Total Xylenes	0.40	2/8	0.94-5.95	49M02
<b>SEMIVOLATILES</b>				
Acenaphthene	1.12	4/8	1.19-12.8	49M02
Acenaphthylene	0.655	5/8	1.30-6.43	49M02
Anthracene	0.019	2/8	0.031-0.034	49M04
Benzo(A)Anthracene	0.0004	8/8	0.0006-0.026	49M02
Benzo(B)Fluoranthene	0.0003	8/8	0.0003-0.012	49M02
Benzo(K)Fluoranthene	0.0001	7/8	0.0004-0.008	49M02
Benzo(G,H,I)Perylene	0.001	5/8	0.001-0.023	49M03
Benzo(A)Pyrene	0.0003	7/8	0.0004-0.015	49M02
Chrysene	0.008	4/8	0.01-0.03	49M04
Dibenz(A,H)Anthracene	0.0009	5/8	0.0009-0.005	49M02
Fluoranthene	0.0003	8/8	0.003-0.356	49M02
Fluorene	0.125	6/8	0.142-10.8	49M02
Indeno(1,2,3-cd)Pyrene	0.0008	4/8	0.001-0.009	49M02
Naphthalene	0.470	7/8	0.878-49.9	49M02

**Table 7 Summary of Groundwater Results for Site 49  
(Monitoring Wells)**

**Page 3 of 3**

<b>Constituent</b>	<b>Detection Limit (ug/L)</b>	<b>Detected/ Analyzed</b>	<b>Concentration Range Detected (ug/L)</b>	<b>Location of Maximum</b>
Phenanthrene	0.02	7/8	0.02-21	49M02
Pyrene	0.011	7/8	0.015-0.850	49M02
Petroleum Hydrocarbons* (mg/L)	0.2	3/8	1.6-32.3	49M05

**Notes:**

\* Hydrocarbon fingerprint analysis for well 49M02 indicated 5.4 mg/L of a C9-C19 hydrocarbon, based on an Arctic JP-7 reference.

\* Well 53M05 also has been analyzed for major cations, major anions and selected metals.

**Table 8 Summary of Groundwater Results for Site 50  
(Groundwater Probes)**

<b>Constituent</b>	<b>Detection Limit (ug/L)</b>	<b>Detected/ Analyzed</b>	<b>Concentration Range Detected (ug/L)</b>	<b>Location of Maximum</b>
Toluene	1	3/21	1	50FW01 50FW04 50FW06

**Note:**

Samples from the groundwater probes were analyzed by the HLA field laboratory.

**Table 9 Summary of Groundwater Results for Site 50  
(Monitoring Wells)**

Page 1 of 2

Constituent	Detection Limit (ug/L)	Detected/ Analyzed	Concentration Range Detected (ug/L)	Location of Maximum
<b>1988 RESULTS</b>				
<b>VOLATILES</b>				
Chloromethane	0.4	4/7	0.58-1.32	50M03
Benzene	0.15	3/7	3.0-65.2	50M01
Chlorobenzene	0.34	1/7	1.73	50M05
Ethylbenzene	0.46	2/7	136-332	50M01
Toluene	0.25	2/7	52.5-261	50M01
Xylenes, Total	0.85	2/7	602-1860	50M01
<b>SEMIVOLATILES</b>				
Butylbenzylphthalate	1.5	3/7	3.7-12	50M05
Diethylphthalate	1	1/7	6.6	50M05
2,4-Dimethylphenol	0.28	1/7	4.7	50M05
2-Methylnaphthalene	0.9	1/7	454	50M01
Naphthalene	0.26	1/7	540	50M01
Phenol	1	1/7	6.8	50M05
<b>1989 RESULTS</b>				
<b>VOLATILES</b>				
Chloroform <sup>b</sup>	0.2	1/12	1.01	50M08
Benzene	0.20	4/12	3.08-335	50M01
Ethylbenzene	0.50	3/12	0.99-2,210	50M01

**Table 9 Summary of Groundwater Results for Site 50  
(Monitoring Wells)**

Page 2 of 2

Constituent	Detection Limit (ug/L)	Detected/ Analyzed	Concentration Range Detected (ug/L)	Location of Maximum
Toluene	0.30	3/12	2.69-2,080	50M01
Total Xylenes	0.40	3/12	11.3-6,940	50M01
<b>SEMIVOLATILES</b>				
Bis(2-ethylhexyl)Phthalate	2.0	1/12	4.1	50M02
2,4-Dimethylphenol	2.0	1/12	12	50M05
2-Methylnaphthalene	1.0	3/12	1.3-12,000	50M01
Naphthalene	1.0	2/12	32-5700	50M01
Petroleum Hydrocarbons (mg/L)	0.2	2/12	0.3-1,980	50M01

**Notes:**

<sup>a</sup>Hydrocarbon fingerprint analysis for well 50M01 indicated 7.6 mg/L of "weathered product", based on an Arctic JP-7 reference.

<sup>b</sup>Chloroform not detected in resample.

<sup>c</sup> 1988 sampling round also included analysis for major cations, major anions and selected trace metals.

## VI SUMMARY OF SITE RISKS

The primary risk being addressed by this interim remedial action is exposure to groundwater contaminated with organic constituents. Because petroleum products contain toxic chemicals that dissolve into water, the first step in reducing risk at these sites is to minimize the volume of petroleum product in contact with the groundwater. Although petroleum products contain many chemicals, those of primary concern are benzene, toluene, ethylbenzene, and xylene.

Based on existing information, the areas of floating petroleum product are relatively localized and do not appear to be spreading quickly. However, if not removed, these floating petroleum products will continue to dissolve into the groundwater and may migrate, thus contaminating larger areas of groundwater in the future.

Contaminants such as benzene, ethylbenzene, toluene, and total petroleum hydrocarbons are present at levels exceeding their respective drinking water standards in the upper regions of the groundwater near the areas of floating petroleum products. One Base drinking water supply well (Well D) is located close to the Powerplant Fuel Spill Area. The upper regions of the aquifer are not presently used as a drinking water source at Eielson AFB; however, it would pose an unacceptable risk if used for domestic purposes (e.g., drinking and showering). In addition, if not addressed, the contaminants may migrate both horizontally and vertically and may contaminate the existing deeper drinking water supply wells.

## **VII DESCRIPTION OF ALTERNATIVES**

The following alternatives for reducing floating petroleum products on top of the water table and preventing further migration of the contamination were evaluated:

Alternative 1 -- No Action

Alternative 2 -- Free Product Extraction

Alternative 3 -- Vacuum Extraction

Alternative 4 -- Soil Excavation / Free Product Removal

Alternative 5 -- Bioventing

### **Alternative 1: No Action**

The no action alternative is presented as a baseline for comparison against other alternatives. Under this alternative, the Air Force would not take further action to remove floating petroleum product contamination. The floating petroleum product would remain on top of the water table and continue to dissolve into the groundwater and migrate away from the source.

### **Alternative 2: Free Product Extraction**

This alternative would remove floating petroleum product from the top of the water table by pumps installed in groundwater wells, culverts, or trenches. Viable pump configurations include skimmer pumps and dual pump systems. The type and number of pumps used would be determined based on source-specific conditions to achieve optimal floating petroleum product removal. The goal of efficient pumping is to maximize removal of floating product while minimizing extraction of large volumes of groundwater.

Extracted groundwater would be monitored to determine whether it required treatment using physical/chemical processes such as air stripping, oil-water separation or carbon filtration. Depending on the volume, the treated effluent would then be discharged to the ground surface, surface water bodies or to the subsurface soils via trenches or wells. Small volumes of extracted groundwater may be discharged to the Base sewage treatment plant in accordance with state and federal regulations.

Depending on its quality, the recovered floating petroleum product would then be burned on-base at the waste oil incinerator or recycled or disposed of off-base through the Defense Reutilization and Marketing Office.

### **Alternative 3 Vacuum Extraction**

This alternative includes the extraction of floating petroleum product using vacuum extraction wells (VEWs). The objective of vacuum extraction is to accomplish removal of the floating petroleum product. In addition, the VEWs would remediate some of the residual contamination in the soil.

Well casings will be installed to below groundwater level and smaller diameter drawdown tubes or "slurp" tubes will be inserted. The open end of the slurp tube will be placed at the interface of the floating petroleum product and the watertable. The top of the casing will be sealed and a vacuum pump connected to the slurp tube. With the tip of the slurp tube located at or slightly above the interface, the floating petroleum product will be removed but very little, if any, groundwater will be removed. The well head will be constructed so the depth of the draw-down tube can be adjusted. An operator will manually place and maintain the tip of the tube slightly above the interface between the floating petroleum product and the watertable within the well casing.

As a vacuum is applied at the end of the drawdown tube, a vacuum is created within the perforated well casing. The influence of the vacuum spreads radially from the well casing. The actual radius of influence depends on a number of site-specific soil parameters (e.g., air permeability, particle size distribution, moisture content, etc.). Ambient air will be pulled through the soil within the radius of influence generated around each vacuum well.

The floating petroleum product removal rate is dependent on the rate the product enters each perforated well casing. This system does not establish a cone of depression because very little, if any, groundwater will be extracted by the slurp tube. The product flows to the vacuum well because of a difference in hydrostatic pressure.

The two phase flow rate (i.e. air and liquid in the drawdown tube and vacuum header piping to the vacuum pump) at each well can be manually controlled at the wellhead and may be changed to achieve a desired floating petroleum product removal rate.

The air and liquid mixture from the vacuum wells will flow to a knock-out tank immediately upstream of the vacuum pump. The purpose of the knock-out tank is to separate the liquid/air streams. The liquid will be pumped from the tank to an oil water separator. Petroleum product will be removed from the tank by gravity flow. The product will either be reused, recycled or sent off base for disposal. The effluent water will either be treated using physical/chemical processes before discharge to a surface water or subsurface or discharged to the base wastewater treatment plant. The exit air from the air/water separator tank will flow to an elevated tip flare where the volatile hydrocarbons will be thermally destroyed. Propane may be added to the exit air to maintain desired combustion temperatures.

#### **Alternative 4: Soil Excavation / Free Product Removal**

Under this alternative, soils overlying floating petroleum products would be excavated and treated to remove contamination. The options for treating contaminated soils include soil washing followed by landfarming or bioremediation. Soil washing segregates the soil particles by size to separate larger soil particles from the smaller particles that contain the majority of the contamination. The reduced volume of smaller soil particles would then be treated by compost landfarming or bioremediation, both of which enhance the biological degradation of petroleum in soils.

Recovered petroleum product recycling would occur as described in Alternative 2. The excavated area would be backfilled with clean soil.

This alternative was not evaluated for the refueling loop (ST20), the powerplant area (ST48), or Building 1300 (ST49) because the presence of existing buildings or runways preclude the excavation of large areas of soils. This alternative was only evaluated for the Blair Lakes Facility (SS50 through SS53).

#### **Alternative 5 Bioventing**

Bioventing is one of the technologies proposed for site remediation at Eielson AFB. Petroleum hydrocarbons in the environment are, to some extent, broken down by native microorganisms. This is generally an aerobic process, in which the limiting substrate is oxygen. Bioventing enhances this natural biodegradation by supplementing oxygen to the native organisms in the subsurface soil.

Air is pumped through a system of manifolds by a pump. A low volume of air is pumped through each of these manifolds which can be controlled individually. These manifolds then distribute the air to the subsurface. The air injection rate is determined by two factors: there must be enough air flow to assure an adequate radius of influence across the site, yet the air flow should be as low enough to minimize surface emissions. This is accomplished by saturating the soil with air and adjusting air flow down to where the desired radius of influence is maintained. The air is injected just above the water table at approximately six feet.

Bioventing is monitored for microbial activity by measuring respiration rate. Periodic soil borings will be taken and analyzed to determine if the bioventing is significantly enhancing product degradation. Potential surface emissions are monitored by taking air samples at the surface of the site via evacuated canisters. Methods for heating bioventing sites may be utilized to extend the operating season and/or increase microbiological activity.

Although bioventing acts primarily to remediate petroleum-contaminated soils, it is also applicable to the removal of relatively thin layers of floating petroleum products, which are difficult to pump effectively. One objective of bioventing is to minimize further leaching of contaminants from subsurface soils into the groundwater. In addition, as the soil is remediated, the cleaner soils may draw the floating petroleum products up into the soil directly above the groundwater where it can undergo biological degradation.

#### **Discussion of ARARs**

The purpose of the interim remedial action is to remove floating petroleum product, a known source of contamination from the groundwater surface until the final remedy is implemented. This interim action is neither intended to restore the aquifer to drinking water conditions, nor to attain all federal and state ARARs relating to cleanup of the aquifer or the soil. The USAF, USEPA and ADEC expect that such ARARs will be addressed by the final remedy to be selected for the site.

The ARARs for this interim remedy relate to the treatment and disposal of groundwater that is collected and treated during implementation of the interim remedial action and for air emissions resulting from the treatment.

Air emissions resulting from the operations of a flare or an air stripper to the extent that they meet the criteria of a hazardous waste shall comply with the requirements of 40 CFR 265 Subparts AA & BB and the substantive requirements of State of Alaska Air Quality Control regulations (18AAC 50). (Alternatives 2,3 and 5)

Spent carbon from a carbon adsorption unit and filters and/or residual materials from the pretreatment system which meet the criteria of a characteristic waste will be stored, treated, recycled, or disposed of in accordance with the Resource Conservation and Recovery Act, 40 CFR Parts 262-264, 266, and 268. (Alternatives 2,3 and 5)

To the extent that effluent will be discharged to surface water bodies or subsurface, such discharge shall comply with the substantive requirements of Alaska Water Quality Standards set forth in 18 AAC 70 and Alaska Wastewater Disposal regulations set forth in 18 AAC 72. (Alternatives 2,3 and 5)

## VIII Summary of the Comparative Analysis of Alternatives

### EPA Evaluation Criteria

The alternatives presented above were evaluated based on the following nine EPA evaluation criteria. Brief definitions of criteria are summarized below:

#### Threshold criteria

- **overall protection of human health and the environment** -- How well does the alternative protect human health and the environment, both during and after construction?
- **compliance with regulations** -- Does the alternative meet all applicable or relevant and appropriate state and federal laws?

#### Primary balancing criteria

- **long term effectiveness and permanence** -- How well does the alternative protect human health and the environment after completion of cleanup? What, if any, risks will remain at the site?
- **reduction of toxicity, mobility, or volume through treatment** -- Does the alternative effectively treat the contamination to significantly reduce the toxicity, mobility, and volume of the hazardous substances?
- **short term effectiveness** -- Are there potential adverse effects to either human health or the environment during construction or implementation of the alternative? How fast does the alternative reach the cleanup goals?
- **implementability** -- Is the alternative both technically and administratively feasible? Has the technology been used successfully at similar sites?
- **cost** -- What are the relative costs of the alternative?

## Modifying criteria

- **state/support agency acceptance** -- What are the state's comments or concerns about the alternatives considered and about the preferred alternative? Does the state support or oppose the preferred alternative?
- **community acceptance** -- What are the community's comments or concerns about the alternatives considered and about the preferred alternative? Does the community generally support or oppose the preferred alternative?

## Evaluation of Alternatives

The following section compares the alternatives using the EPA evaluation criteria.

### **Overall Protection of Human Health and the Environment.**

Alternative 1 is not protective of human health and the environment because the floating petroleum product would continue to migrate into the groundwater increasing the area of groundwater contamination.

Alternatives 2, 3, 4, and 5 enhance protection of human health and the environment by minimizing further degradation of the groundwater through removal of the floating petroleum products that are acting as a continuing source of groundwater contamination. In Alternatives 3, 4, and 5 the extraction by treating petroleum products adhering to subsurface soils that may also be acting as a source of groundwater contamination further enhances protection of human health and the environment.

### **Compliance with Applicable or Relevant and Appropriate**

**Requirements.** Because this interim action is focused on the removal of floating petroleum product, it is not anticipated that groundwater or soil cleanup standards will be achieved. Groundwater and soil cleanup standards will be addressed as part of the final action for this operable unit. Applicable or relevant and appropriate requirements will be met for actions taken under Alternatives 2, 3, 4, and 5.

**Short-Term Effectiveness.** Alternatives 2, 3, and 4 would begin floating petroleum product removal in the least amount of time. Alternative 5, which uses bioremediation in the soils, would achieve floating petroleum product removal more slowly than the other alternatives.

No short-term adverse impacts to workers or the environment during construction or operation are anticipated that could not be readily addressed using standard engineering practices.

**Long-term Effectiveness and Permanence.** Although this interim remedial action is not intended to fully address the statutory mandate for permanence, the removal of floating petroleum product which is a primary source of groundwater contamination is in furtherance of the statutory mandate for permanence. The alternatives offer varying degrees of long-term effectiveness and permanence, depending on the success of the technology. Removal of the floating petroleum products is the critical first step toward cleanup by removing the continuing source of groundwater contamination.

Alternative 2 is intended to remove floating petroleum product only and is not designed to treat subsurface soils above the groundwater table. Alternatives 3, 4, and 5 would provide a greater degree of long-term effectiveness and permanence by addressing subsurface soil contamination that also may be acting as a continuing source of groundwater contamination.

**Reduction of Toxicity, Mobility, or Volume Through Treatment**  
The goal of Alternatives 2, 3, 4, and 5 is to significantly reduce the volume of floating petroleum product and to minimize further migration of contamination into the groundwater. Alternative 3, Vacuum Extraction, and Alternative 5, Bioventing, would achieve this reduction through treatment by enhancing biodegradation of the petroleum product in the vadose zone.

**Implementability.** Alternative 2 has been used with varying degrees of success to address similar spills in the Fairbanks area. However, this alternative may be limited if large volumes of groundwater are removed as part of the extraction process. The extracted groundwater would require treatment before disposal.

Because it is still considered an innovative technology, Alternative 3 may have difficulties that complicate full-scale implementation. However, if proven successful, this alternative should produce smaller volumes of groundwater than Alternative 2.

Alternative 4 is constrained by existing underground utility infrastructure and existing roadways, and requires excavation and treatment of large volumes of soil.

Alternative 5 has been extensively described in the literature and used for remediation in warmer climates. However, the viability of bioventing in colder climates is still being tested and may impact implementation.

**Cost.** The relative estimated cost (minus 30% to plus 50%) for each alternative at a given source is presented in table below. The cost for Alternative 2 may increase if large volumes of groundwater require treatment. The Cost of Remedial Actions (CORA) model was used to develop the cost for Alternatives 2 and 4. Alternatives 3 and 5 are innovative technologies, thus making cost estimates more difficult. Cost estimates were developed for these alternatives using cost data from treatability studies.

**State Acceptance.** The ADEC has been involved with the preparation of this Record of Decision and concurs with the selected alternatives.

**Community Acceptance.** The community has accepted the selected remedies based on the community response to the proposed plan and public meeting as documented in the attached Responsiveness Summary.

## **IX The Selected Remedy**

The following alternatives were selected for the four areas in OU1:

- ST20 Refueling Loop E-7 Complex: Alternative 5 - Bioventing
- ST20 Refueling Loop E-9 Complex: Alternative 2 - Free Product Extraction
- ST48 Powerplant Fuel Spill Area: Alternative 3 - Vacuum Extraction
- ST49 Building 1300: Alternative 2 - Free Product Extraction
- ST50 - ST53 Blair Lakes Target Range: Alternative 2 - Free Product Extraction

### **Remediation Goals**

The primary goal and minimum objective of this interim action is to remove floating petroleum product from the groundwater in an attempt to control the source of continuing contamination. The Air Force will conduct free product removal in a manner that minimizes the spread of contamination into previously uncontaminated zones by using recovery and disposal techniques appropriate to hydrogeologic conditions at the site. The Air Force will properly treat, discharge, or dispose of recovery byproducts using methods approved by and in compliance with federal, state, and local law.

Floating petroleum product will be removed to the extent technically practicable as agreed to by the USAF, the USEPA and the ADEC or until the final remedy for OU1 is in place. Performance of the selected remedy will be evaluated periodically to determine if modifications are needed. For example, if in Alternative 2, static recovery systems initially installed fail to recover sufficient product, more recovery systems will be installed, maintenance and pumping of existing systems may be monitored more frequently, or the system may be replaced with more traditional dual pump systems, bioventing or vacuum extraction. It is the intent of these projects to operate during the seasonal temperatures of winter at Eielson. Based on changing site conditions or implementability difficulties, it may be appropriate to modify the system or utilize one of the other alternatives described in this Record of Decision.

#### **ST20 Refueling Loop E-7 Complex**

Alternative 5 was selected for this site because of the relatively thin layer of floating product and the favorable subsurface geology, which allows sufficient airflow to encourage bioremediation. Alternatives 2 and 3 were eliminated because of the marginal cost effectiveness associated with removal of thin layers of floating petroleum products.

A treatability study began in the summer 1991. This study will provide additional data to allow the treatment alternative to be fully developed and evaluated and to reduce cost and performance uncertainties.

#### **ST20 Refueling Loop E-9 Complex**

Alternative 2 was selected for this area. The relatively thick layer of floating petroleum product and the large number of existing wells allow for rapid removal of significant volumes of floating petroleum product. Alternatives 3 and 5 are constrained by the access and safety concerns caused by the adjacent flightline.

#### **ST48 Powerplant Fuel Spill**

Alternative 3 was selected because this relatively small area of contamination is suitable for bioremediation. Alternative 3 is also expected to result in smaller volumes of groundwater requiring treatment than Alternative 2. Alternative 5 is not appropriate because it is not capable of removing floating petroleum product of the thickness found at this site.

A vacuum extraction treatability study is planned for the fall of 1992. This study will provide additional data to allow the treatment alternative to be fully developed and evaluated.

#### **ST49 Building 1300**

Alternative 2 was selected for this area. The relatively thick layer of floating petroleum product and the large number of existing wells allow for rapid removal of significant volumes of floating petroleum product. Alternatives 3 and 5 are constrained by the access and safety concerns caused by the adjacent flightline.

#### **ST50 through ST53 Blair Lakes Target Range Facility**

Alternative 2 was selected for this facility because of the large area affected by floating petroleum product. Alternatives 3 and 5 would require an extensive number of wells to treat an area of this size. Alternative 4 is not preferred because contamination was identified under several buildings, precluding excavation as a viable alternative.

## **X STATUTORY DETERMINATIONS**

This interim action is protective of human health and the environment, complies with Federal and State applicable or relevant and appropriate requirements for this limited scope action, and is cost effective. Although this interim action is not intended to fully address the statutory mandate for permanence and treatment to the maximum extent practicable, this interim action utilizes treatment and thus is in furtherance of that statutory mandate.

Because this action does not constitute the final remedy for the Eielson AFB Operable Unit 1 site, the statutory preference for remedies that employ treatment that reduces toxicity, mobility, or volume as a principal element, although partially addressed in this remedy, will be addressed by the final response action.

Subsequent actions are planned to address fully the threats posed by the conditions at Operable Unit 1. Because this remedy will result in hazardous substances remaining on site above health-based levels, a review will be conducted to ensure that the remedy continues to provide adequate protection of human health and the environment within five years after commencement of the remedial action. Because this is an interim action ROD, review of this site and of this remedy will be continuing during development of final remedial alternatives for Operable Unit 1.

### **Protection of Human Health and the Environment**

The selected remedy aids protection of human health and the environment by minimizing further degradation of the groundwater through removal of the floating petroleum products that are acting as a continuing source of groundwater contamination. The vacuum extraction remedy selected for ST48 and the bioventing remedy selected for ST20 will also treat residual subsurface soil contamination that may also be acting as a source of groundwater contamination.

### **Compliance with Applicable or Relevant and Appropriate Regulations**

The purpose of the interim remedial action is to remove floating petroleum product, a known source of contamination from the groundwater surface until the final remedy is implemented. This interim action is neither intended to restore the aquifer to drinking water conditions, nor to attain all federal and state ARARs relating to cleanup of the aquifer or the soil. The USAF, USEPA and ADEC expect that such ARARs will be addressed by the final remedy to be selected for the site.

The ARARs for this interim remedy relate to the treatment and disposal of groundwater that is collected and treated during implementation of the interim remedial action and for air emissions resulting from the treatment.

Air emissions resulting from the operations of a flare or an air stripper to the extent that they meet the criteria of a hazardous waste shall comply with the requirements of 40 CFR 265 Subparts AA & BB and the substantive requirements of State of Alaska Air Quality Control regulations (18AAC 50). (Alternatives 2,3 and 5)

Spent carbon from a carbon adsorption unit and filters and/or residual materials from the pretreatment system which meet the criteria of a characteristic waste will be stored, treated, recycled, or disposed of in accordance with the Resource Conservation and Recovery Act, 40 CFR Parts 262-264, 266, and 268. (Alternatives 2,3 and 5)

To the extent that effluent will be discharged to surface water bodies or subsurface, such discharge shall comply with the substantive requirements of Alaska Water Quality Standards set forth in 18 AAC 70 and Alaska Wastewater Disposal regulations set forth in 18 AAC 72. (Alternatives 2,3 and 5)

### **Cost Effectiveness**

The selected remedy is cost effective because it provides overall effectiveness proportionate to the cost.

### **Utilization of Permanent Solutions and Alternative Treatment Technologies**

This interim action is not designed or expected to be the final action for OU1, but the selected remedy represents the best balance of trade-offs among the alternatives with respect to the degree of overall protection of human health and the environment, compliance with ARARs, implementability and cost

effectiveness, given the limited scope of this action.

#### **Preference for Treatment as a Principal Element**

Because this action does not constitute the final remedy for Operable Unit 1, the statutory preference for a remedy that employs treatment that reduces toxicity, mobility, or volume as a principal element, although partially addressed in this remedy, will be addressed by the final response action.

The selected remedies will significantly reduce the volume of floating petroleum product on the top of the water table and minimize further migration of contamination. The vacuum extraction and bioventing remedies reduce toxicity through removal and treatment of contaminants from subsurface soils.

EIELSON AIR FORCE BASE  
OPERABLE UNIT 1B PROPOSED PLAN  
RESPONSIVENESS SUMMARY

**A. OVERVIEW**

From 15 May - 15 Jun 92, Eielson Air Force Base Alaska presented it's proposed plan for Interim Remedial Action at Operable Unit 1B, and requested public comments. The preferred alternatives were explained at a town meeting on 9 Jun 92. The proposed actions would remove fuel products floating on the groundwater at seven source areas of Operable Unit 1B. This is not a final action to clean the soil and ground water, but removing the floating fuel layer will reduce the total amount of contamination dissolved into the groundwater, and reduce the likelihood of further soil contamination if the fuel moves to other areas. The preferred alternatives varied at each source area. They included bioventing, vacuum extraction, and free product extraction using wells and trenches.

Public response indicates satisfaction with the preferred alternatives. The community understands this is an interim action, and supports removing known contaminants to prevent any further environmental damage. The public shows confidence in the Air Force's commitment to protect human health and the environment, and realizes further soil and water final cleanup actions will follow. Several comments addressed economic issues not directly related to the cleanup alternatives in this proposed plan.

These sections follow:

- Background on Community Involvement.
- Summary of comments received during public comment period and United States Air Force (USAF) responses.
- Remaining concerns.
- Attachments. Community Relations Actions for Operable Unit 1B. Public Response Documents.

**B. BACKGROUND ON COMMUNITY INVOLVEMENT**

In Nov 89, Eielson was placed on the Environmental Protection Agency (EPA) National Priorities List, and a Federal Facilities Agreement was signed between the USAF, EPA, and Alaska Department of Environmental Conservation (ADEC) in May 91. This OU 1B Interim Remedial Action is the first major cleanup effort at this site. The contamination stems from a variety of fuel leaks and spills

dating back to WWII, mostly related to refueling and fuel storage/distribution systems. These areas have up to a foot of fuel in some places, with an average of a few inches of floating fuel also known as "floating Product". In addition to the Public Meeting, there were also two meetings with community representatives from North Pole, Fairbanks, and the University of Alaska Fairbanks (UAF) as part of the Eielson Technical Review Committee. The meetings addressed cleanup alternatives and answered any questions from the community representatives. The comments from the representatives are discussed below:

1. The Administrative Record is at UAF, but an additional Information Repository at the North Pole library would be better.

USAF Response: The North Pole library declined due to limited space for such a collection. However, a handbook containing the Community Relations Plan, Fact Sheets, Newsletters, an index of Administrative Record documents, and other information was placed there. Additionally, an Information Repository was prepared for Noel Wien Library in Fairbanks and will be a second source of information in Fairbanks.

#### **C. SUMMARY OF COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD**

Comments raised during the public comment period for the Proposed Plan for Interim Remedial Action at Eielson AFB Operable Unit 1B are summarized below. Copies of correspondence related to these comments are included as an attachment to this Responsiveness Summary.

1. One person commented he was concerned about the safety of bioventing, and had questions about the effects of fuel (benzene) vapors on the atmosphere.

USAF Response: A personal reply was sent to the individual explaining the process and some scientific facts related to the proposal. Additionally, the person was invited to Eielson to view the bioventing technology demonstration, operating at a contaminated source area related to flightline refueling. The process is an EPA approved technology, which meets safety standards. It was designed to remediate (break-down) fuel products using microscopic "bugs" which naturally "digest" the contamination. This occurs in place, underground with minimal fuel vapor released. Based on the information and tour provided, the person was satisfied bioventing is a good alternative, and supported bioventing as the preferred alternative.

2. One person commented about the possibility of contamination from Eielson causing deformities in wildlife near Minto, Alaska located about 70 miles West of the base. The person reported several growths on moose and waterfowl taken in that area.

USAF Response: The likelihood of Eielson contamination being a primary factor in these reports is extremely remote. There is no

ATTACHMENT

COMMUNITY RELATIONS ACTIVITIES  
OPERABLE UNIT 1B

Community Relations activities for Operable Unit 1B include the following:

- Eielson Superfund start-up Public Meeting. 8 Oct 91
- Community Relations Plan released. 8 Oct 91
- Administrative Record availability announced. 10 May 92
- Proposed Plans mailed to mailing list. 12 May 92
- Technical Review Committee meets. 14 May 92
- Proposed Plans available at libraries. 15 May 92
- Proposed Plan comment period announced. 15 May 92
- Town meeting advertized. 15-17 May, 7-9 Jun 92
- Front page article in local newspaper. 8 Jun 92
- Technical Review Committee meets. 8 Jun 92
- Public Meeting, OU-1B Proposed Plan. 9 Jun 92
- Fact sheets and newsletter available. 9 Jun 92
- Public Comment period. 15 May-15 Jun 92
- Response to comments. (letters, tour). 15 Jun-15 Jul 92

evidence to suggest contamination has left the confines of the base. The contamination considered in Operable Unit 1B is subsurface fuel dissolving into the groundwater, which could pose a risk to those who remove it from the ground. It would pose low risk to animals 70 miles away. However, Eielson suggested any future animal irregularities could be sent to the Department of Fish and Game for examination. The Air Force would assist in determining the cause and would coordinate actions if related to contamination, to begin corrective actions by the appropriate agency.

#### **D. REMAINING CONCERNS**

Several people commented on issues not directly related to the alternatives considered for Operable Unit 1B. These were mostly economic concerns, mostly related to employment opportunities in conjunction with environmental cleanup operations. Some issues are presented below.

1. One person wanted to know how he could get work on the base.

USAF Response: In anticipation of such economic questions, Eielson provided a fact sheet describing employment opportunities on base, and how interested companies could submit their qualifications to the Base Contracting Office.

2. One person wanted to know if the Air Force provided insurance assistance for small businesses trying to do contaminated site cleanups.

USAF Response: At present, there are no programs to subsidize contractors in this manner. In order to qualify for cleanup contracts, the company must have proper training, equipment, and established operations in place.

ATTACHMENT

COMMUNITY RELATIONS ACTIVITIES  
OPERABLE UNIT 1B

Community Relations correspondence related to Operable Unit 1B public comments.

1. Letter from (b) (6) about bioventing concerns.
2. USAF acknowledgement advising intent to answer comments.
3. Letter from (b) (6) requesting clarification.
4. USAF reply about scope of test project for (b) (6)
5. USAF reply providing technical data answers to (b) (6)
6. Letter from (b) (6) requesting documents.
7. USAF Reply advising the documents would be provided.
8. Comment Sheet from (b) (6) about wildlife concerns.
9. USAF reply answering those concerns for (b) (6).

June 15, 1992

BY FAX - 377-1215  
6/15/92 at 4:24 p.m.

Captain Gary Turner  
Eielson Air Force Base  
Public Affairs Office  
3112 Broadway Ave., Suite 5  
Eielson Air Force Base, AK 99702-1870

Re: Public Comments, Eielson  
Air Force Base Environmental Cleanup

Dear Sir:

This letter is to provide public comment with respect to the currently pending cleanup program for Eielson Air Force Base.

I am quite concerned at this time with respect to the proposed ~~bio-venting project~~, or any other concept pertaining to a technique of environmental cleanup known as ~~landfarming~~. The concept appears to be nothing more than a fancy way to describe simply letting the volatile organic vapors escape into the atmosphere. As I understand the process, based upon the limited information disseminated by your office and by study and research, what is essentially proposed is a system by which the soils are aerated, in conjunction with the use, to a certain degree, of fertilizers and/or naturally occurring bacteriological agents.

My immediate concern, regardless of how the chemical process takes place, is that the venting of the gases to the atmosphere is extremely harmful to the atmosphere and to organisms. Simply stated, evaporation is simply being given a fancy name.

It is a well established fact at this time that the ozone layer of the Earth is beginning to suffer drastically through the release into the atmosphere of various pollutants. It is furthermore known that various gases, and chemical compounds, such as benzene, may have a significant environmental impact. Consider, for example, that in California, gas stations must have venting systems on the nozzles which dispense gasoline to vehicles in order to cut down on benzene and other volatile vapors.

Elson Air Force Base

June 15, 1992

Page 2

Despite this, what is currently being apparently proposed by your agency on an admittedly experimental basis is a massive bio-venting or land farming project, the net result of which will apparently be a significant discharge into the atmosphere of various pollutants, with unknown consequences. Has anyone ever injected the gases into an ozone chamber to determine the result? Has there ever been a toxicity study done on the vapors to determine their effects on humans, other animals and plants?

I furthermore have serious questions as to whether or not the impact of this particular project has been evaluated in the form of an environmental impact statement or even an environmental assessment report. If an environmental impact statement of this particular process of bio-venting or any other process involving land farming and/or aeration of this type of material in Fairbanks, Alaska, with its unique extremes of climate has not been the subject of an environmental impact study, serious legal issues and liabilities can develop. As you are aware, the environmental laws make specific provision for a citizen to sue under the environmental laws, specifically the Clean Air Act and Clean Water Act, as well as other laws, provided that notice is given of the intention to sue. If the EPA has not certified this cleanup process, a citizen suit is likely.

The ironic thing in this particular case is that the notice is required to be given to the United States Government of the intention to sue yet, at this time, it is the United States Government which is engaging in the process over which any litigation would be brought.

My request at this juncture is quite simple. ~~I believe that a specific environmental impact statement must be done~~ with respect to any process which involves the aeration of soils, bio-venting, land farming, or any other procedure by which what is essentially contaminated soils is being converted into contaminated air. Due to the high degree of toxicity of vapors such as benzene, the problems with the ozone layer, and the highly experimental nature of the process which is currently being proposed, I object strongly to Fairbanks, Alaska, or any other part of the world, for that matter, being utilized on an experimental basis to develop a process which has not been specifically approved by the EPA, or which has not been specifically the result of an environmental impact statement for this particular project and location. This is especially important when one recognizes that the ozone layer is considered to be most delicate in the Arctic regions.

Page 3

(b) (6)

WRS/ml



DEPARTMENT OF THE AIR FORCE  
PACIFIC AIR FORCES

343 WG/CV  
3112 Broadway Ave Ste 1  
Eielson AFB AK 99702

(b) (6)

Fairbanks AK 99701

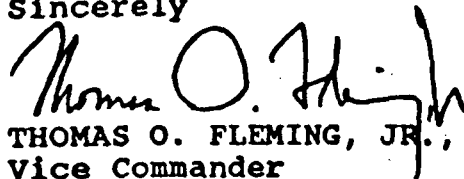
Dear (b) (6)

We received your letter dated 15 June 1992 and appreciate your comments about our cleanup efforts at Eielson, particularly the bioventing project at Operable Unit 1B. This bioventing proposal is part of our remediation effort under CERCLA. The landfarming alternative was merely considered as a possible option for this remediation. However, in joint consult with the Environmental Protection Agency (EPA) and Alaska Department of Environmental Conservation (DEC), the bioventing option was the preferred alternative. Since the remediation is carried out under CERCLA, no environmental assessment or environmental impact statement is required. CERCLA includes a detailed process for assessing risks to human health and the environment prior to deciding on a cleanup alternative.

Under our CERCLA Federal Facilities Agreement (FFA), EPA and DEC are partners with the Air Force in the Eielson cleanup. As indicated in our Proposed Plan (attached), bioventing was the alternative preferred by EPA, DEC, and the USAF. We have forwarded your comments to EPA and DEC for their consideration. Furthermore, I've directed my engineering staff to provide you with a written response to the technical and scientific topics addressed in your letter.

If you'd like to visit Eielson to view the bioventing area first hand, please contact Capt Gary Turner at Eielson Public Affairs Office, 3112 Broadway Ave Ste 5, Eielson AFB AK 99702-1870.

Sincerely

  
THOMAS O. FLEMING, JR., Colonel, USAF  
Vice Commander

1 Atch  
Proposed Plan

cc: HQ PACAF/DEV  
11 AF/JA  
ADEC  
EPA

(b) (6)



June 24, 1992

Captain Gary Turner  
Eielson Air Force Base  
Public Affairs Office  
3112 Broadway Avenue, Suite 5  
Eielson Air Force Base, AK 99702-1870

Re: Bio-Venting Eielson Air Force Base Project

Dear Captain Turner:

On June 15, 1992, I submitted comments with respect to the proposed bio-venting project currently under contemplation for Eielson. I was informed that I would be receiving a written reply to my comments.

Please be advised that I am disturbed at this time, with respect to the proposed bio-venting processes. Prior to any institution of these processes, I would request that my comments be answered, so that I may evaluate more carefully the procedure which is being employed. Obviously, written comments will have little effect in the event that the processes are already in place and operating. What concerns me in this regard is that the front page newspaper article of the Daily News-Miner approximately thirty days ago left me with the impression that bio-venting had already been selected as a method of cleaning up the Air Force Base and was, in fact, already in progress.

Could you please confirm to me that there are currently no bio-venting projects in process at Eielson?

Sincerely,

(b) (6)





DEPARTMENT OF THE AIR FORCE  
PACIFIC AIR FORCES

343 WG/CC  
3112 Broadway Ave Ste 1  
Eielson AFB AK 99702

JUL 2 1992

(b) (6)

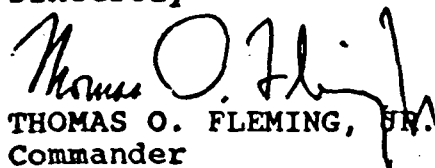
We received your second letter dated 24 Jun 92 requesting clarification about Bioventing cleanup alternatives. I'd like to immediately answer some specific questions you raised.

Concerning the Proposed Plan for cleanup at Operable Unit 1B, we'll evaluate all public comments related to these source areas. All comments will be addressed in our Responsiveness Summary and Record of Decision which describes why one alternative was selected over another. Additionally, we'll send you a personal answer containing the Bioventing scientific information.

Regarding Bioventing remediation, we have no large scale operation such as the one proposed for Operable Unit 1B. However, the Environmental Protection Agency (EPA) and US Air Force (USAF) are conducting a joint-effort treatability study at one source area on Eielson AFB. This is a test to confirm Bioventing works as well in an arctic environment as it does in other parts of the country. After operation for one year, our test shows promising indications concerning effectiveness. Through our Federal Facility Agreement, the EPA, USAF, and Alaska Department of Environmental Conservation (DEC) each agreed to conduct the research. There is no requirement for public comment when conducting an EPA Treatability Study.

This should alleviate any misunderstandings about the scale of our project and the public comment process. For further information, contact Capt Turner at Public Affairs, 3112 Broadway Ave Ste 5, Eielson AFB AK 99702-1870.

Sincerely

  
THOMAS O. FLEMING, SR., Colonel, USAF  
Commander

cc: HQ PACAF/DEV  
11 AF/JA  
DEC  
EPA



DEPARTMENT OF THE AIR FORCE  
PACIFIC AIR FORCES

343 WG/CC  
3112 Broadway Ave Ste 1  
Eielson AFB AK 99702

JUL 10 1992

William R Satterberg, Jr.  
709 Fourth Ave  
Fairbanks AK 99701

Dear Mr. Satterberg

Thank you for your June 15 letter concerning air emissions at Eielson Air Force Base. Human health and the environment are important issues at Eielson, and we feel we have already taken measures which should allay your concerns.

Our bioventing project is being conducted jointly with the Environmental Protection Agency (EPA), and was also approved by the Alaska Department of Environmental Conservation (ADEC). Bioventing projects in other states have resulted in significantly increased rates of biodegradation and reduced offgases. The purpose of the Eielson project is to demonstrate this technology in cold weather. Bioventing was specifically developed to enhance biodegradation by native microorganisms and reduce volatilization and offgases. Biodegradation oxidizes hydrocarbons to biomass, water, and carbon dioxide. Monitoring the bioventing project through respiration tests ensures the microbes are being nourished at the proper rates to prevent offgases. In short, there is degradation rather than evaporation of the harmful products, with little or no benzene vapor released. Sampling data indicates benzene vapor levels around three parts per million at two feet above the ground surface, and undetectable levels at four and six feet above ground.

Although landfarming was not chosen as a preferred remediation alternative for the proposed plan for cleanup of Operable Unit 1B, (OU-1B), Eielson is currently involved in a landfarming project coordinated with both the EPA and ADEC, with written approval for the work plan received from ADEC. The project has an approved health and safety plan which delineates worker exposure risks and protective measures against contaminants. The affected environment was evaluated by determining exposure routes through water and air, and calculating the associated risk. Landfarming posed no significant environmental risk. Taking no action would leave contaminated soil in the existing stockpile, which involves greater risk than remediation - an unacceptable alternative. Landfarming, therefore, offers an economically practical and environmentally sound cleanup method. It involves more than mere evaporation. Through increased surface area, solar warming and aeration result in increased degradation by microbial activity.

The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) sets the parameters for risk. The range of acceptable risk to human health and the environment is between  $10E-4$  to  $10E-6$ .  $10E-6$  means the chance of being harmed is roughly a million to one. The range is also the standard used by the Comprehensive Environmental Response Compensation and Liability Act (CERCLA).

We evaluated the risk for the landfarming project and calculated a benzene concentration of 28.0 micrograms per cubic meter would equate to  $10E-4$  and a concentration of 0.3 micrograms per cubic meter would be  $10E-6$ . We predicted concentrations of 3.2 micrograms per cubic meter, which falls on the conservative end of the acceptable range. Testing confirmed concentrations were even lower than our estimates. Simply stated, we examined the risk and are staying within the acceptable range to comply with applicable laws.

Your letter mentioned the ozone layer degradation and California's strict emission controls. Although deterioration of the earth's ozone layer concerns us, this degradation is not increased by Eielson projects. Rather than destroying the ozone layer, volatile benzene exposed to ultraviolet light produces ozone.

The chemical reaction which makes ozone from benzene and other hydrocarbons requires the presence of nitrous oxides ( $NO_x$ ) and long-term exposure (8-10 hrs) to ultraviolet light.  $NO_x$  is an urban and industrial pollutant which exists in relatively high concentrations in California. Since California also has high levels of hydrocarbon emissions and long ultraviolet intense days, it does have a problem with ozone pollution. Specifically, their problem is caused by too much ground-level ozone rather than the ozone layer breakdown. The high benzene levels react with ultraviolet light to form ozone in concentrations sufficient to cause health problems. For this reason, California requires gas pump stage II vapor recovery systems and strict vehicle emissions controls.

Eielson AFB has a small population and low  $NO_x$  production. The Alaskan interior has very short winter days and cold temperatures. As a result, both benzene volatilization and ultraviolet exposure are quite limited during most of the year. Even in the summer, when volatilization is highest, only low levels of ozone-producing benzene are emitted. Thus, Eielson cleanup efforts are neither a significant source of ozone pollution nor a contributing factor to ozone layer degradation. Incidentally, we are voluntarily installing stage II vapor recovery equipment at our Base Gas Station.

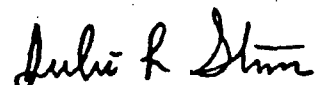
In a related area, Eielson recognizes the harmful effects of chlorofluorocarbons (CFCs) on the ozone layer. We restrict their use to only a few maintenance practices for which no other substitutes are available.

This letter addressed the technical questions you posed regarding our environmental programs. Your comments will be considered along with others received as we select our cleanup alternative(s) for OU-1B. All comments will be addressed in the Responsiveness Summary which will be part of our OU-1B Record of Decision (ROD).

The Responsiveness Summary, ROD, work plans, investigations, and volumes of additional technical information are all available to the public as part of our Administrative Record (AR). This collection contains the information which we considered or relied upon when selecting our cleanup actions. Eielson's Administrative Record is housed in the Rasmuson Library at the University of Alaska Fairbanks, in the Arctic and Polar Regions archives section.

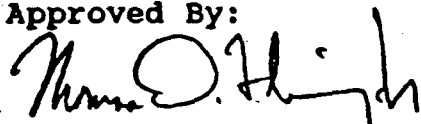
If you have any other questions, please feel free to contact us through Capt Turner, Eielson Public Affairs, 3112 Broadway Ave Ste 5, Eielson AFB AK 99702. Thank you for your interest in the Eielson projects.

Sincerely



JULIE L. STRINGER  
Remedial Project Manager

Approved By:



THOMAS O. FLEMING, JR., Colonel, USAF  
Commander



DEPARTMENT OF THE AIR FORCE  
PACIFIC AIR FORCES

Mr William R. Satterberg, Jr.  
709 Fourth Avenue  
Fairbanks, Alaska 99701

Dear Mr ~~Satterberg~~ *Bill,*

Thank you for your cordial letter of August 12th. I share your optimism regarding the prospects of the Eielson Bioventing Project, and will be happy to keep you posted on its progress. To that end, I have forwarded your letter to the Public Affairs Office. They have added you to a "Concerned Citizens" list, which means you will be notified of all developments in Eielson's CERCLA clean-up including bioventing. In addition, we will provide you with any specific documents that are releaseable under the Freedom of Information Act as you request them. These requests are handled on a case by case basis, and the documents must exist at the time the request is made. Again, thank you for your letter, and I'm glad you enjoyed your visit.

A handwritten signature in cursive script, reading "Tom Fleming", is written over a horizontal line.

THOMAS O. FLEMING, JR., Colonel, USAF  
Commander

Thomas O. Fleming, Jr., Colonel, USAF  
August 12, 1992  
Page 2

Otherwise, I want to thank you again very much for your kind and courteous generosity, and wish to extend my compliments to what I consider to be a very professional group of people.

(b) (6)

(b) (6)

August 12, 1992

Thomas O. Fleming, Jr., Colonel, USAF  
Vice Commander  
3112 Broadway Ave., Ste. 1  
Eielson AFB, AK 99702

Re: Eielson Bioventing Project

Dear Colonel Fleming:

This letter is to thank you for the very kind and professional tour which was given to myself, and others, on Friday, July 10, 1992, with respect to the land farming and bioventing projects. Although I still have certain considerations with respect to the projects, generally, I must state that I was most impressed with the professionalism of your staff, and what I considered to be genuine dedication to their projects, and especially wish to thank Lt. Steven Richter and Sgt. Curtis Rogers. I also wish to thank you personally for your willingness to allow me to ask questions and to view this particular project.

I have no reservation in stating that if the projects prove to be successful and meet environmental considerations, there may be substantial benefits to be realized by all.

If possible, I would appreciate copies of any information which is generated from the bioventing project, including even interim reports, data compilations, and the like. Although I realize that the jury will not be in on this particular bioventing project until apparently two to three years from this date, I am most interested in following the project at this juncture, with respect to not only the remediation which is being accomplished, but also with respect to byproducts monitoring, and would ask, pursuant to a Freedom of Information Act request which you may treat this request as consisting of, that I be furnished with all data as soon as it becomes available to be disseminated. This data, furthermore, is critical to determining if environmental degradation may be occurring during the pendency of the project. Although I certainly would like to have a copy of the final report when it is produced, any interim information which is not covered under the confidentiality provisions of the Freedom of Information Act would be most appreciated and requested at this time.

00.571

## TOWN MEETING AGENDA

Tuesday, 9 June 1992  
7 PM  
North Pole Middle School

7:00	INTRODUCTION OF SPEAKERS
7:05-7:35	EIELSON ENVIRONMENTAL BRIEFING BY COL FLEMING
7:35-7:45	BREAK
7:45-8:30	PROPOSED PLAN BRIEFING
8:30-9:00	QUESTIONS AND ANSWERS

15 MAY-15 JUNE 1992 IS PROPOSED PLAN 30-DAY PUBLIC COMMENT PERIOD.

SUBMIT WRITTEN COMMENTS TO:

CAPT GARY TURNER  
PUBLIC AFFAIRS OFFICE  
3112 BROADWAY AVE  
EIELSON AFB, AK 99702

COMMENTS: Caught moose in Mint Flats  
area that was infected with a series of puslike  
growths on its intestines and between meat  
and skin. Caught geese on Tanana river (between  
with large deformities on side of head. Nenana  
at Mint)

KNIK FLATS - newspaper accounts of  
ducks and geese dying (1991)

Would like to be considered for contract work. 2

(Optional) NAME:  
ADDRESS:

(b) (6)

(b) (6)

Minto, AK. 99758

Minto, AK. 99758

Put on mailing list for future information? ☒ N (Circle One)



DEPARTMENT OF THE AIR FORCE  
PACIFIC AIR FORCES

343 WG/PA  
3112 Broadway Ave Ste 5  
Eielson AFB AK 99702-1870

AUG 17 1992

(b) (6)

We appreciated your input and participation at the town meeting for the cleanup effort at Eielson AFB, AK. We researched your comments regarding diseased and/or deformed wildlife on the Minto Flats to identify any military connection. We do not suspect any connection between Eielson AFB and the deformations or diseases you noted. However, we are interested in assisting in any way to determine the cause. To investigate further, we have been in contact with the Alaska Fish and Wildlife Protection Agency.

The Alaska Fish and Wildlife Agency has requested more information and would appreciate your assistance. They have not received any previous reports of deformed game in the Minto Flats area and would like you to contact Mr Ed Crain at 456-5156 with any information you might have.

Thank you for your interest in the environment. For more information about Eielson's cleanup, contact me at 377-2116.

Sincerely

A handwritten signature in cursive script, reading "Gary Turner".

GARY TURNER, Capt, USAF  
Chief, Public Affairs